Covering all Acorn machines

Acorn COMPUTING

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Not any more, details inside

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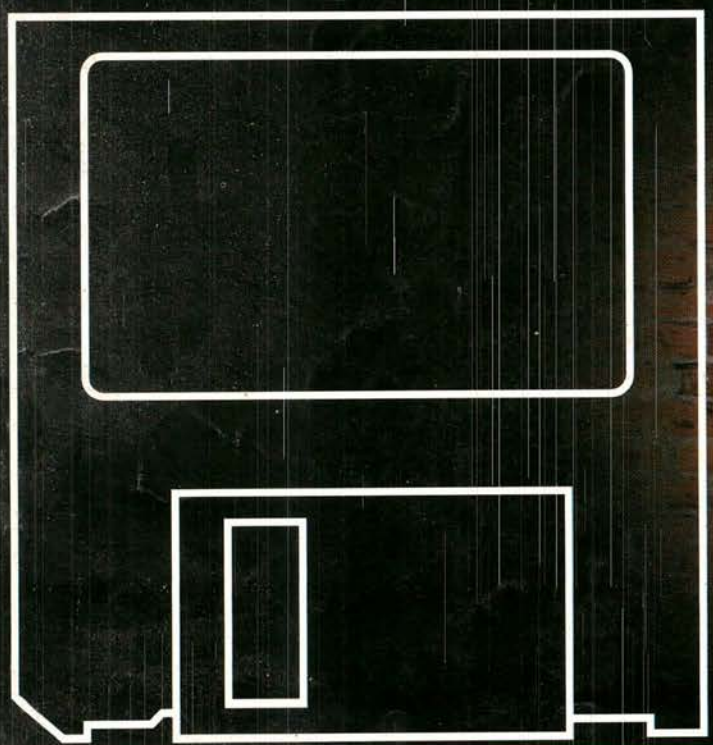

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MARCH 1995 Vol.13 No.1 £3.50 Hfl 14.95

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IDG MEDIA

Risc PC • Archimedes • A300 series • A400 series • A3000 series • A4000 • A5000

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Next Acorn User on sale March 23 1995

The very last Acorn Computing of all

Well this is it, the very last Acorn Computing of all, and it's packed with more features and reviews than you'll find in any other Acorn magazine. The new Risc PC PC card is working and we check it out, plus there's a massive feature on Easter DTP, what's new in raytracing, an update on OCR packages and lots more besides.

REGULARS

Comment 13
Steve Turnbull winds up *Acorn Computing* with a warning about the present and a look into the future

News 15
All the latest news of products and events in the fast-changing world of the Acorn computer

Techforum 38
Michael Rozdoba rounds off with a brief history of lime plus 16-bit division, fast square roots and escaping the Wimp

Mad Hatter 50
Our very own adventure wizard, Bob Redrup, helps you to explore worlds of fantasy and excitement

The Databay 54
Hal wraps up with a look into the past and future of games and game playing in the Acorn world

Public Domain 56
Teri Paul is back again with her pick of the public domain and shareware markets

Problem Solved 68
Technical editor, Mike Cook, delves into your mail to answer another selection of hardware questions, posers and problems

Body Building 73
Mike Cook ends his four-part series on expanding your 8-bit BBC Micro with a look back at the last 12 years

Letters 80
Your last opportunity to express your ideas and views on the Acorn market, from viruses to joysticks

REVIEWS

Risc PC PC card 20
PC-compatibility at an affordable price, or the thin-end of the wedge? We see what's behind the new card

Raytracing 22
We check out the subject of raytracing and see how the new package, Merlin, performs its rendering task

Shorts 56
A quick rundown on some of the latest products for Acorn machines:
- Labelstar
- Font Designer's Toolkit
- Type Tutor
- Smart CD+

Eureka 3 32
What's changed in this new version of the classic Acorn spreadsheet? Clem Vogler takes a careful look

TextEase 33
We review this low-cost DTP package, is it deserved of its low price tag or does it have hidden depths?

OCR 36
This time last year we reviewed the two competing OCR packages. After many updates we check them again

Sounds in the machine 40
Two low cost ways of sampling and manipulating sound checked, plus Superior Software's Speech 2

Leisureware 52
The very latest in the Acorn games scene, featuring:
- Sally and Wally
- Desktop Hacker

Learning Curve 62
Our teachers put some of the latest releases through the toughest test of all – the classroom:
- The Revenge of Dragon Droom
- Pond
- Happy Matrix

Fireworkz Pro 77
With the final stage of the integrated package, Recordz, now available, we see how the system performs

FEATURES

The MegaDisks 7
Check out what's in store for you this month on our superb MegaDisk and Subscription disk

Machine Architecture 30
Continuing this mini-series, this month Mark Smith explains about monitors and the colours they can display.

Easter Art 45
Steve Bruntlett supplies vast quantities of clip-art and tons of ideas to brighten up your Easter eggs

Real 3D Graphics 59
Steve Turnbull draws his series to an untimely close with a look at the data structures needed for 3D scenes

Netiquette 76
Amit Gupta explains how to survive on the worldwide Internet without upsetting people unintentionally

Bob and Trev 78
The two electronic pen-pals meet in a final denouement that rocks the foundations of the local pub

Most of the editorial and adverts in this magazine were produced with ArtWorks and Impression from Computer Concepts.

THE MEGADISK

Britain's best Acorn cover disk contains hours of fun, education and useful utilities for the novice and the proficient. You'll also find programs linked to the editorial features such as Body Building and Techforum.

Full details on what you can access on this month's disk – see Page 7.

● Simon the Sorcerer

We promised it over a year ago and here it is at last – the demo version of the superb interactive adventure that's taking the Acorn market by storm

● Easter Work

A sample of the clip-art available on this month's Subscription disk – available separately, see MegaDisk pages

● Databay

Four cheats for your favourite games courtesy of Hal, plus the passwords for Spobbleoid

● TechForum

Performing 16-bit division the fastest possible way, and calculating square roots

GET YOUR NEWSAGENT TO RESERVE YOU A COPY OF ACORN USER – SEE PAGE 13

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All the following CD-ROM drives are PhotoCD compatible and include a driver for CDFS =>2.20

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XM-3401B (Caddy)	330kb/s, 200ms	£235
XM-3501B (Caddy)	600kb/s, 135ms	£299

Suitable for RiscPC. SCSI interface not included.

Cumana CD300i IDE	300kb/s, 300ms	£199
Cumana CD300ia IDE		£249

External SCSI CD-ROM Drives

Panasonic (Tray)	**300kb/s, 300ms**	**£229**
XM-3401B (Caddy)	330kb/s, 200ms	£300
XM-3501B (Caddy)	600kb/s, 135ms	£379

SCSI interface not included. Add extra £25 for A3000.

SCSI cards

Morley uncached SCSI card	£130
Morley cached SCSI card	£170
Cumana SCSI II card	£169

The above cards are suitable for A300, A400, A3000 (Ext), A540, A5000 and RiscPC. For others see MultiPodules. Add £25+VAT to Cumana SCSI II card for external cable.

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540Mb 12ms	£189	1Gb 12ms	£349

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270Mb Syquest	£289	270Mb Syquest	£289
SCSI External Drives (Incl. Cartridge)			
105Mb Syquest	£289	270Mb Syquest	£299
Syquest Cartridges			
105Mb Cartridge	£45	270Mb Cartridge	£55

Hard Disc Interfaces/Accessories

50-50C SCSI Cable	£12	25-50 SCSI Cable	£15
SCSI II-50 Cable	£25	SCSI Terminator	£10
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11 - Tools
12 - AnimalsGB

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TopicArt12 - AnimalsGB

TopicArt4 Entertainment

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Up until now it has only been possible to print posters from Draw & Sprite files. Now with QuickTile you can create posters from ANY RISCOS application, including Impression. Simply enter the size of poster required & select PRINT from the application! QuickTile does the rest, printing each tile with crop marks and tile references. RiscPC compatible.

Requires RISCOS 3.10 or later.
Return Disc with SAE for upgrade.
Upgrade from Tiler for £15+VAT.

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Single Refills (req an orig cartr.) £7
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Available in Black, Cyan, Magenta, Yellow, Red, Green, Blue, Brown

Please specify colour(s) required when ordering.These do-it-yourself refills can be used with any printer where the head and ink reservoir are combined, ie, DJ-500, BJ10/200. Please do not send empty cartridges. Please note that colour quality may not be 100% from a black cartridge refilled with another colour. We cannot guarantee against dried up empty cartridges and/or blocked nozzles.

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QuickShow £10

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SpecialArt (Xmas or Signs) £20+VAT (each)

Special editions of TopicArt consisting of a minimum of 4 discs full of clipart

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Toshiba x4 speed (SCSI)	£390

Above SCSI CD-ROM are caddy loading & the prices include uncached SCSI card. The above prices only apply when purchased with a RiscPC system.

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MS-DOS 6.2 & Windows 3.11	£99
2nd Slice Case Upgrade	£99
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A3010 Learning Curve 2Mb RAM	£339
A3010 Early Years 2Mb RAM	£339
Add £170 to A3010's for AKF52 Monitor.	
Free Action Pack with A3010 LC/Early yrs.	
A3020 2MFD/AKF52 MultiScan System	£699
A3020 2MHD60/AKF52 MultiScan Sys	£849
A4000 2MHD105/AKF52 MultiScan Sys	£879
Add £55 for AKF50 Monitor (not A3010)	

Software Packs

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Early Years Talking StartWrite, Paint Pot Flossy the Frog, Mouse in Holland, etc. £42
Home Office £85
EasiWriter2, DataPower, Pipedream4, PCSoft
Above are ONLY available with a system.

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Acorn AKF50 14" 0.28dp MultiScan	£300
Acorn AKF60 14" 0.28dp MultiScan	£320
Acorn AKF85 17" 0.28dp MultiScan	£649
Certain computers will require an adaptor	£12

Portable Computers

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P Book/Psion 3/3a Mains Adaptor	£15
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- The above modem bundles include a cable, - ArcTerm7 and ArcFAX.	
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TV Tuner with TeleText (CC)	£157
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See also top of page for other hard discs
Please call for SCSI Hard Discs.

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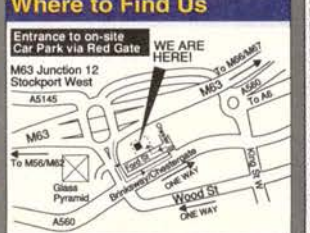

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Access VISA SWITCH

MAR 95

The MegaDisk

What's on this month?

- Simon the Sorcerer
- Easter clip-art
- Databay
- Techforum

Simon the Sorcerer: Graphic adventure

THIS is a small portion of the graphical adventure converted by James Callin and Rob Wyatt and available on Acorn machines courtesy of Gamesware (01703 457333). This will work on a 1Mb machine – see specific boxed instructions – but RISC OS 3 is preferred.

The scene you are faced with sees Simon needing to acquire a gem, a rope and a hook plus a container full of some quite disgusting Swamp Stew. There is a small area in which to find these things to give you a flavour of the whole game – but not of the Swamp Stew, unless you are particularly fond of woodlice.

The game will not end when you have reached the objective, but will let you continue to explore. To exit the demo at any time press F12 – but beware that this will return you directly to the desktop without asking if you want to quit, and when you restart you will have to begin again.

The demo will work without being un-archived, but will go faster if it is installed on a hard disk. To do this, simply open the directory containing !STS_Demo and drag it to your hard disk in the normal way. Remember that the !System directory must have been seen by the Filer, otherwise you may get a *System Resources not found* message.

To start the exploring, double-click on the !STS_Demo icon in the directory. This will install an icon on the iconbar. To start to play the game, click on this icon.

Most of the interface is mouse-driven – just select the verb at the bottom of the screen, and the object that you want to interact with. If the pointer is in the picture area of the screen, the verb will default to *Walk to*, so if you want to move somewhere you can just click there without clicking on the verb first. Similarly, if the pointer is in the bottom section of the screen (inventory), then the verb will default to *Look at*.

Hints and tips

There are certain key points about graphical adventures, such as the fact that there are lots of objects in each room that you might miss unless you look carefully. Be both methodical and meticulous. A good way of finding objects that you might be able to interact with is to move the mouse pointer around, and watch the text line to see if the object's name appears on it.

More specifically, here are some clues if you start to find the going hard:

- Dwarves may be short and boring but they're hardly worth ignoring
- It's amazing what's written on rocks when you pick them up and look at them
- It's something about the face of a Dwarf that makes them instantly recognisable to each other
- Guards like a drink (or the promise of a drink) as much as the next man (or Dwarf), even if they are on duty...
- ...particularly cheap drinks
- The key to the situation when hiding something, is not to move when tickled
- Eat, Eat, Eat then be merry.

The section with the Swampling is simpler than the Dwarf Mine section so you may find it easier to go here first – just head off to the top right exit on the first screen.

The full game has hundreds more screens, 35 more tunes and many more puzzles similar to the two in the demo. It comes on 10 compacted disks and costs £39.99. It ➤

Simon – for 1Mb machines

If you have a 1Mb machine you will not be able to de-archive Simon, so run it from within the archive. There is a program included on the MegaDisk to help you do this. This will run Simon but without the music and front end.

Key control

The following keys affect the environment:

F1	Slow text – each sentence of the speech stays on the screen for longer
F2	Medium speed text (default)
F3	Fast text
F5	Music volume down
F6	Music volume up
F12	Exit to desktop
M	Toggle music on/off

FAULTY DISK?

If your cover disk or 32-bit subscription disk has a physical fault – doughnut won't rotate in the sleeve, disk errors and so on – please return it for replacement to:

TIB plc
Tib House
11 Edward Street
Bradford
BD4 7BH

If there seems to be a fault with one of the programs please contact the magazine by post describing your machine set- up and exactly what happens when you run the program.

➤

is playable either from the disks or is fully installable for which approximately 8Mb of free disk space is required.

Alternatively, a CD-Rom version of the game is being completed as we go to press, and will be on general release in the spring. This version has Chris Barrie (of *Red Dwarf* and *The Brittas Empire* fame), reading the part of Simon, and many other actors performing the rest of the text. The default setting provides no on-screen text, although it is possible to play with the screen text if you so desire. This version is a massive 200Mb game and brings Simon into a new dimension of fun and playability.

Databay – games people play

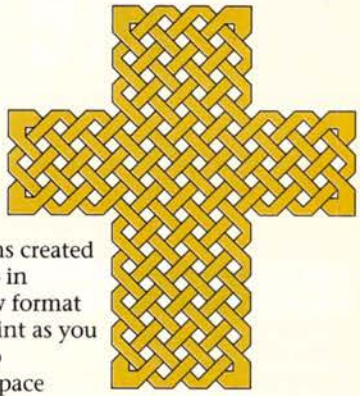
HAL has compiled a series of Hacker and Desktop Hacker cheat modules to help you win through with: Cannon Fodder, Magnetoids, Wolfenstein and Spobbleoid. In addition there are cheats – courtesy of D.O. Paisley – for Cannon Fodder, and the passwords for Spobbleoid.

Techforum – aides de programming

TWO programs are featured on this month's disk: FracRoot and Barnett. The latter comes from M.R.A. Barnett and is his response to the Challenge in the December issue. Full details of both programs can be found on page 38.

EasterWork – DTP design

YOU'LL find a taster of some of the designs created in our DTP tutorial on this month's disk – in particular a series of Celtic Crosses in draw format which you can edit, manipulate or just print as you see fit. There are a host of other designs to complement the feature on page 45, but space restrictions mean that these have had to go on to the subscription disk.



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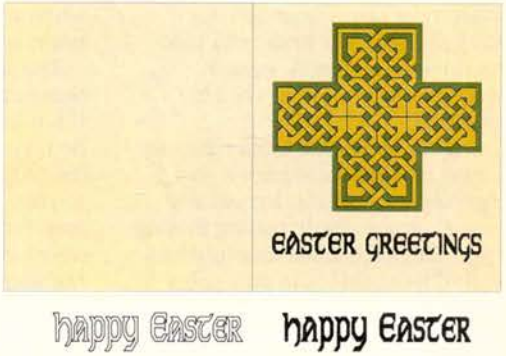
IF you don't subscribe to *Acorn Computing* but would like to take advantage of Steve and Ann Bruntlett's designs, send a SAE and formatted disk to: *Easter Clip-art, Acorn Computing, Media House, Adlington Park, Macclesfield SK10 4NP.*



The 32-Bit Subscription Disk

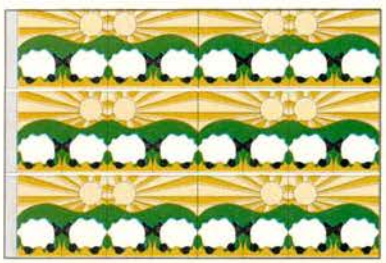
What's on this month?

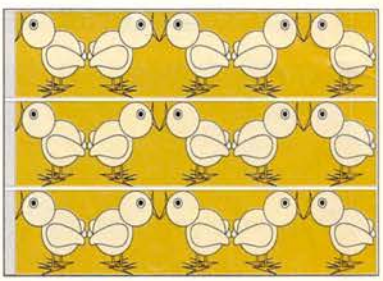
- Easter clip-art

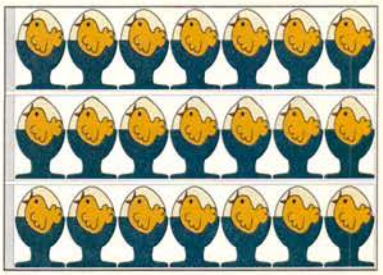
DTP for the family – Easter

FOLLOWING our popular Christmas DTP features, this month we have a collection of artwork in Draw format you can use for Easter cards and activities regardless of age or computer ability:

- ***Cake Decoration***: Add a chicken or sheep cake frill to your Simnel cake. You can also add a three-dimensional hanging bird decoration
- ***Disguises:*** Hide your cream eggs – or hard boiled eggs – with a variety of designs
- ***Easter Basket:*** Create your own basketwork for paper or silk flowers. You'll also find an Easter biscuit recipe and a template for an Easter cutter
- ***Easter Cards:*** Two and three-dimensional cards for you to make and impress your family and friends
- ***Flower Basket:*** The flowers to put into your basket, or make into cards, hat designs and so on
- ***Sewing Cards:*** A classic favourite with young children – whether you opt for the chick or bunny design.







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Users of EasyFont will also find a handy linking option has been included to allow all fonts to be installed directly.

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No DTP user should be without the ClipArt Collection. It contains around 2,500 RISC OS draw format clips, plus Artworks files, and several thousand more mono sprite clipart files.

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Well over 1000 music tracks are included on the disc, enough to satisfy even the most avid devotee. Pieces are arranged by their music type, which include Classic, Piano, Rave, Pop and Mood. Also on the disc are several hundred samples for track creation.

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New Product

Dalriada are soon to release their second DTP utility. Just as TableMate has proven to be the de facto standard for table creation, this new application will be the leading package in its field - diagramming. Whether you want to research your family tree, or organise a company, this is the program you need. Features include:

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- O.L.E. compatible - so easy to use with leading packages such as Impression
- A wide selection of standard symbols provided

TableMate 2

TableMate 1.1 has been bundled with Impression Style and Publisher from Computer Concepts. TableMate 2 greatly improves on TableMate's features whilst retaining its ease of use. New facilities include:

- Word wrapping inside columns
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- Insert & delete multiple rows or columns
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- Greater control of linespacing
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Price: £32-50 inc. p&p. Impression Style and Publisher users receive a £15 discount.

Price of new product: £50 inc. p&p.

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Pete Sykes

Acorn

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Swan song

THE headline is probably a little overdramatic. *Acorn Computing* may be merging with *Acorn User* from the April issue, but it's not the end of the world. Still, let's see what I can say in this last editorial.

Something which made my blood boil a couple of years ago was the concept of ILS – Interactive Learning Systems. It sounds cute and it sounds American. Well, it's certainly the latter, but the former is less true.

ILS is one of those *it seemed like a good idea at the time* things which abound in the education market until people start to look at the results and realise that perhaps it wasn't such a good idea after all – after it's ruined the education of a whole section of the community.

So what is it? Imagine you have an integrated set of programs that teach by multiple choice-style questioning, but – and here's the clever bit – the software keeps detailed records of how a child is doing and can generate lots of statistics. And those are its key points. You can sit a child down in front of an ILS program and forget about them for an hour, and it means a teacher has lots of statistics they can throw at the bureaucracy to show the children are doing something useful.

At BETT'95 a certain manufacturer and a supplier of PCs to schools were demonstrating an ILS program they'd imported from the US. In this program, just to give you a flavour, there was a picture of some children kicking a football around and the question was: *What are these children playing?*

The answer, to any British person, is Football. But NO! You're wrong. It is, of course, *Soccer*. Football is that thing played by padded American males using rugby balls.

And this *British* company are selling this wonderful, American, ILS product to British schools. Pah! I don't mind dealing with American imports and explaining to my daughter that Americans do and say things differently to us, but to have it in the classroom? No thanks.

Of course ILS is wonderful – didn't you hear me say so – in fact it's so wonderful that the State of Maryland is throwing it out of their education system, and they're not alone. The US has had enough of ILS, so they're sending it over here.

What did they find happened in schools that used ILS? They found that it did indeed help the under-achievers (don't you just love PC-ness). However, the average children got no better and got no worse, and the clever kids (to hell with PC-ness), were pulled down – they *all* became average.

To be fair, our software producers want to give us a different sort of ILS, they have OILS – that's *Open* ILS. This is of course better, it's home-grown. The more intelligent software houses may simply modify their existing, superb, products to generate the statistics and we'll still have good software.

Just be careful out there, okay?

The future

The demise of an Acorn magazine is not something to be greeted with enthusiasm – even if you read a different one. The perception of the PC herd will be that Acorn are continuing to shrink and will disappear soon.

I don't agree and I'll tell you why.

Acorn Computing is suffering from the lag in Acorn's fortunes between the release of the A5000 and the Risc PC. The delay was horrendous and meant a complete lack of growth in the Acorn market – and anything that doesn't grow, shrinks.

At present Acorn's prospects haven't looked better, and its future is genuinely rosier than it was even in the early 80's. The computer boom of the 80's was driven by ignorance – and its associated credit boom: *Let's buy a computer 'cos everyone else is and let's buy it on credit because we can.*

The blooming future is dependent not on personal computers but on ARM Ltd, Online Media and the set-top boxes. You can read the news in this issue to see the companies that are now jumping on the band-wagon of Interactive Multimedia (IMM). Phase One of Acorn's trial is finished and Phase Two is beginning, expanding the number of homes served by this powerful system.

ICL are providing the powerhouse server systems, Nat West are giving online banking, and every week new companies make clear their intention to join the consortium. The Online Media set-top box *works*. It's working now, you can go to Cambridge and find it in people's houses.

And remember, Online Media is a division of Acorn, it's not a separate company like ARM. The success of OM is Acorn's success. As IMM expands, companies that produce software will be forced to take Acorn seriously, because it's their boxes at the end of the telephone line.

Very soon Acorn are going to announce their next developments in personal computer design, the multi-processor machines – there *should* be an upgrade path with the Risc PC – and people will listen.

Steve Turnbull expresses some opinions in the last issue of *Acorn Computing*

Steve Turnbull

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Thalia Caligula Alison
Psychadelic El Garrett
Heidelberg Jackson
Laser Square Black
Andromeda Charlie
FLINTSTONE Conoith
METRO LINER Future
Царапина EDDA LED Style
CAVEMAN Video Graphic
Jurassic Oregon
Daytona Windsor PONCHO
BUBBLE SNYDER
New Sweet ESPHERES
Gordon
China Town STRONGMAN

Font Pack 3

Dragon MULTICOLOR
Kick Off SIMPSONS
TAX USA Juliet
POLICE HIGH SCHOOL
Rep SQUARE
Oak Wood Romeodn
JACK FUNK QUIZ SHOW
Apollo Good City
annie SPURS american
KRAMER Koshgarian
Notepad My Words
King William Broken Heavy
Camelot Rockman Duncan
CYRILLIC РУССКИЙ
Lauren UPPER WEST
Micro WEISS LICHTNER
CLUMSY RACKHAM
GERMAN Hot Shots
Mushy DRAIN ICED UP
TRIBE SCIENCE Cairo
Mardi Faktos ZALESKI

Font Pack 4

PURE METAL NEW YORK
SNOWY METROPOLIA
Chalk FIRE WATER
GOLF SKATE HEYS d WOOSTER
Black Adder II Vampires
GREEN Rain BONES
First Wives Royal Cowgirl
Birthday LOMBARDIC
Gesele Paganina
Creedmore BERRY
KING FORGE Chopin
Beatville MANIA
DINER rabbi ears
ARR Medusa SPARK
ANTIQUE Fundago
Dust CAD Mucho Madrid2
Gexo GALLEAS Lilah
Anquilla MAZAMA Flemish
EDITION STEMS Dickens
CARACAS FoxTROT
Mixon

Font Pack 5

Liberal Casual Paradox
Ink Blot Arabian
Care Free Maidalone
Skippy Dragon Wish
Phoenix Pixie
REALWOOD Wood Strip
ASSORTMENT Luxembourg
EIRE NEON Polo
Bad Boy Sans Serif
IMPRINT RELIEF X
Poor Type DotMatrix
Genoa Mira Scout
FOLDER Nordic Fred
Coliseo Marquis
DELTA SABERTOOTH
CANTOS
FELTPEN FeltMarker
LOVE PEACE Eye Brow
Bulmouth Harrington
Cracked Big Town
Caraway STUNT Arctic

Font Pack 6

RoughBrush SNAPPEL
DINOSAUR STARBURST
InkyType RHYOLITE
Pure Babe Premium
Natural
Azward SCHOOLWIDE
Jazzy Line SNAZZY Frog
Bent Wires Ola Kessy
BallBotton Tiggas
Hide Base CROSSBOARDS
Cross Wits
GRUBBY
DIEGER Western I
STERLING Western
Bradford LED Urite
Empty Times Open
Prelix ZoAlong Vanite
ZARROW RELIEF
SKULL Skull FECTFONT

Font Pack 7

Expressi EricContor
GLASSLITE
WavyPanty HappyHour
NLQ InkJet HEADBANGER
Knotted HORRORPLUS
Nailed Freaky Hornbines
ROMANBLANC Hostel
SCRIPT ElroOpen SKILINE
ENGRAVER SpikeStripe
SysError ZapOpen
futuristic Fanstus GREKO
Wonderland Untitled
After Striped Upright
ApexRix Comberic
EDGED White COMB
Brocks CROSSCRACK
Brighton
SCRATCH Vincent Cyborg
Ballet Flawed
Cheers Zeppo
DingDong FLAME

Font Pack 8

Minster Mister ANTRIUM
Bands BASELINE
BlandBoy Shot cheese
Compulsive Darling
Decative Neu Dirty
Middleton Olde2 PIGGY
Mirisch Olde3 InSilicon
ISADORA WHITESPARK
Kelvin Always Jagger
לדוגמה Laurance
אלשבטש Oregon Wet
ORNAMENTAL
Stroked NOWOOD
Stumpy MoreScience
MAXIMUS Rudelsberg
PAPERCLIP HISTORIC
SCULPTURE Mariel Spoted
Oliver Serpentine
LYNX MISOZOIC
Home Away SPRAYED
LOOP DE LOOP ZEBRA

Font Pack 9

1968 Knobby LEIGH
ALGERIAL IMPRINT
Broadway SCRIPT LIFFO
Agreshire LimeCity
BIKO Silky Lights
BionicBlues Locking
Celtic NEWS
Chicago Striker Clear
ClassicNib
Digital SPARKED Miami
Columbus Not Silcn
CRYSTAL NOUVEAU
Diamonds OMNIBUS
Dobkin Silver Question
DraftTwo Flowers
Farlow ROLLER
FASTWRITE PaintPoint5
ReLive SoftWords Shaken
Lazer WESTERNS
System X WESTERNS

Font Pack 10

MatchMaker NightTime
DarkTiger Royal Wink Sporty
ST CLASSIC SprayOn
ST GENERATION Veryfat
ST TOASTY ToonTown
ST MONITOR Wezley
ST Movie TOMBSTONE
ST Titles WiseWords
Draftsman Dunkin Kanza
ENVRO Stringy Dracula
SS Open Italian STRENGTHEN
Eras Stage FreeOpen
Housey Companion Thomas
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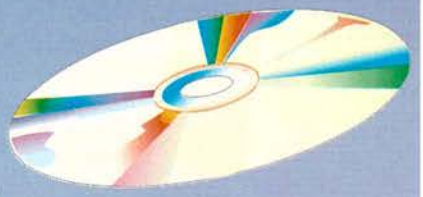
NEXT MONTH

Acorn User and Computing to merge

FROM the April issue – due out in the shops on 23 March – there will be no more *Acorn Computing* as this publication will merge with its sister title *Acorn User*. However, you will still be able to read some of your favourite columnists such as Steve Mumford and Mike Cook.

The April issue of *Acorn User* will also be a first in the Acorn world as it will be the only magazine to have a CD-Rom on the cover. With the price of drives falling and government initiatives, there have never been so many Acorn CD-Roms in the home and in the classroom.

CD-Rom



With 650Mb of space to play with you can be sure that there will be something for everyone on this CD:

- **Sampler education products:** Langdale, Woodland Birds, the full range of 4Mation software and a trailer of Anglia products
- **DTP:** Font Emporium, Landscapes to add style to any presentation
- **Music:** Sibelius 6 and 7 players with sample files for you to explore
- **Art and Design:** A range of demos including ProArt from Clares and a selection of ArtWorks clipart
- **Public Domain:** What, how much and where from plus a selection of the brightest and best freeware and shareware
- **Internet:** Starter kit, World Wide Web browsing software and general information and advice
- **Games:** An extended Dune II and introducing the CD-version of Simon the Sorcerer

. . . and much much more

Floppy disk

If you don't have a CD-Rom drive don't worry, the cover will also feature the usual floppy disk. The April issue will include:

- Ancient Viking game of Hneftafl
- Lottery predictor
- Internet starter kit selection

and more superb programs from *Info

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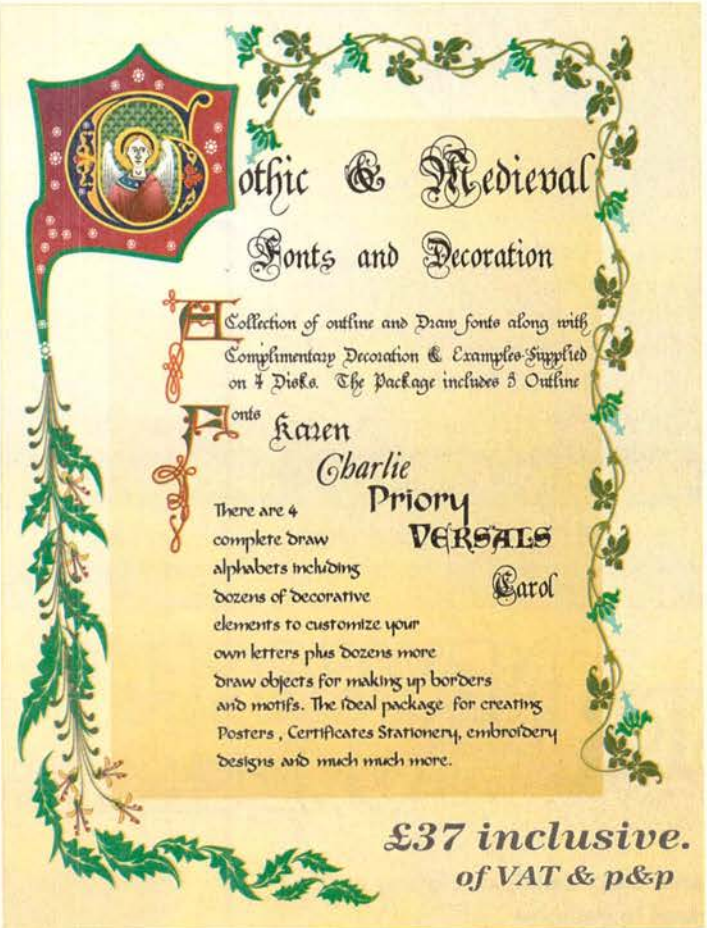
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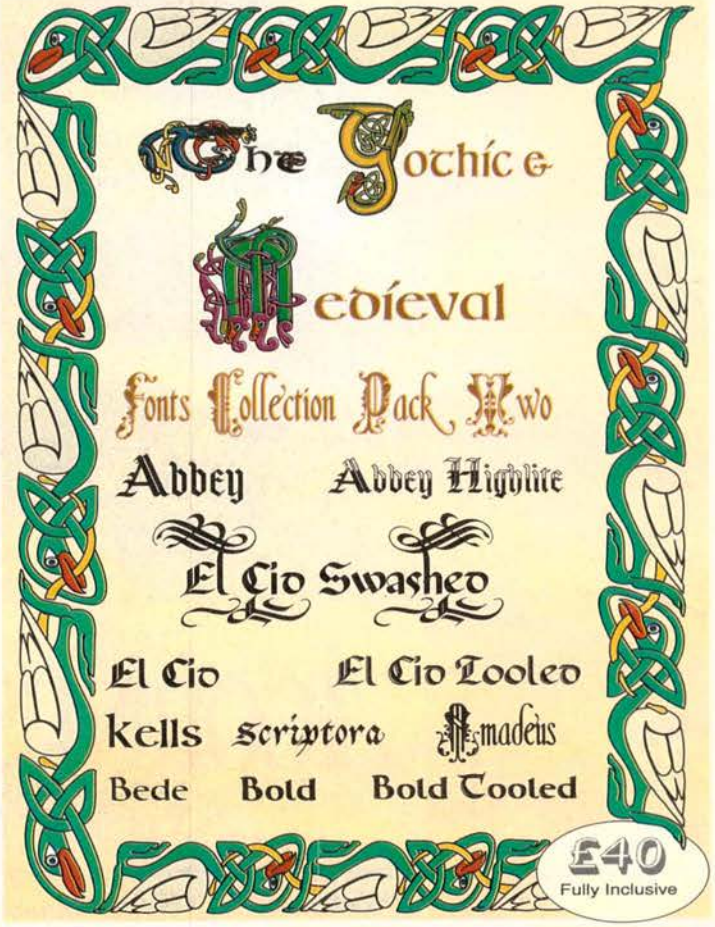

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Powering on

WITH the demise of the distribution agreement between Gamesware and VTi, the Powerpads and PowerSticks are now available to Acorn games players directly from Eclipse/VTi (01243 531194).

Added patience

EVERY RISC OS user has access to Patience as a copy of the classic game comes with your machine. However, there are literally hundreds of different varieties. Creative Curriculum Software (01442 340524) have compiled 20 games in their new release, The Patience Addict.

The Addict contains one and two-pack games from the complex to the simple, and you can buy a copy for only £12.73.

Word-u-like

PLAY on Words is a new package from educational developer Cordelia Jones. Aimed at early and pre-readers, this encourages children to interact with the computer using both sound and animation. The computer speaks any word that appears on screen using children's sampled voices. Click a button and words transform into animations.

Play on Words comes on three disks. The first, entitled ABC, teaches simple sounds for all letters of the alphabet, while Shoot introduces words containing oo, ee, sh, th and ch. Third is Crab which covers bl, br, cl, cr, dr, gl, gr, fl, fr, pl and pr. You can buy the disks separately for £12 each or £30 for the set of three. For more information contact: Cordelia Jones, 1 The Crescent, Cromer NR27 9EX.

Virus update

THE Acorn market has been free of harmful new viruses for some time, with the morons who write them concentrating on new strains of existing viruses. However, four new viruses have appeared and Pineapple Software (0181 599 1476) have incorporated these into their latest version of !Killer so you can make sure they don't make their presence known on your disks.

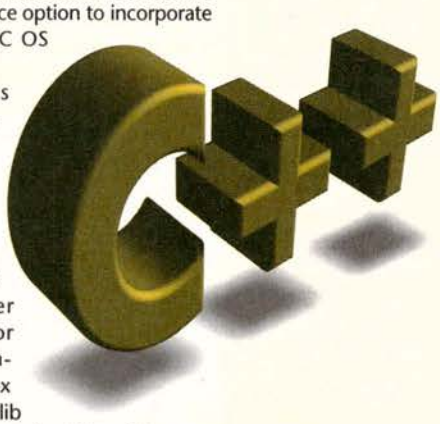
C'ing is believing

ACORN (0223 254254) are about to launch Acorn C/C++. This package is a set of programming tools for professional software developers working in C, C++ and Assembler. On six floppies with automatic installation and four manuals this replaces Desktop C and Desktop Assembler, and Acorn are offering an upgrade path for existing users of these packages. The cost of Acorn C/C++ is £212.72 – or until September 1, £170.17 if you are upgrading – and stocks should be with dealers from mid-March. If you are a Clan Acorn member you can add an extra 10 per cent discount to these prices.

Acorn C/C++ will run on any 32-bit machine with RISC OS 3, 4Mb of ram and a hard disk. The new package gives you an ARM C compiler implementing ANSI standard X3J11/90-013 – this compiler is the one used for system software development on all ARM technology products from the Apple Newton to the Risc PC.

As well as ARM Assembler including support for the ARM 6 and 7 series processors, there is a C++ compiler based on CFront version 3. Add to this the Toolbox which is a set of modules for writing *Style Guide-compliant* desktop applications, a resource editor for defining user interface objects and a set of support tools.

CFront is an implementation of C++ which works with a C compiler and provides the front end for the C++ language elements which are then compiled by the C compiler. Native C++ is an implementation of C++ which compiles directly into object code. ARM are developing a native C++ capability for ARM RISC systems and Acorn have a licence option to incorporate this in future RISC OS products.



While there is no class library for RISC OS, C Front does come with a streams library, and the Toolbox furnishes all the standard user interface calls for RISC OS applications. The Toolbox replaces RISC_OSlib and is object-oriented, style guide-compliant, extensible and allows much of the user interface to be developed without writing code. It can also be called from any RISC OS language.

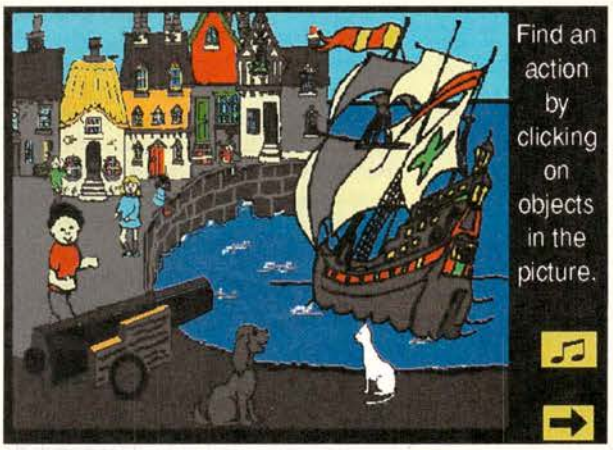
Raise the roof

THE choir of St Laurence's Church, Ludlow, presented a book of anthems to their choirmaster Richard Francis on the occasion of his birthday. Yet this was no ordinary present. The anthems had all been composed and written by Richard Francis and the choir had reproduced the music and words on an A5000 using Rhapsody 3 and Score Draw.

Number crunching

HAZELNUT (01375 375514) have compiled three interactive multimedia learning packages on to one CD-Rom. Aimed at primary schools – or homes with primary aged children – Number Time will work on any 2Mb RISC OS machine for £50.

Alternatively, you can buy the three products separately on floppy disk. Times Tables costs £30 and covers the two to 12 times table with 132 different animations, text and sound using the Genesis system. Number Bonds costs £15 and covers addition and subtraction bonds up to 10 and comes with two worksheets. Third is a new product, Tell Time. On four disks for £20 this covers hours and half and quarter hours with a clock at the end to print and make.



● *There are curious things hidden in this seaside scene*

Sunny intervals from the west

MUSBURY CONSULTANTS (01706 216701) have a program aimed at anyone with RISC OS 3, a CD-Rom drive, a spare £30 and an interest in the weather. Meteosat RISC includes a CD produced by the European Space Agency and contains 23,000 images from the geostationary Meteosat satellite. There is an infra-red image of the whole Earth taken each day from 1986 to 1991. In addition there is one image per month in visible light and assorted extra images of water vapour and snow storms. As well as the full size images (416 x 416) there are handy miniature images enabling half a month to be seen in a single glance.

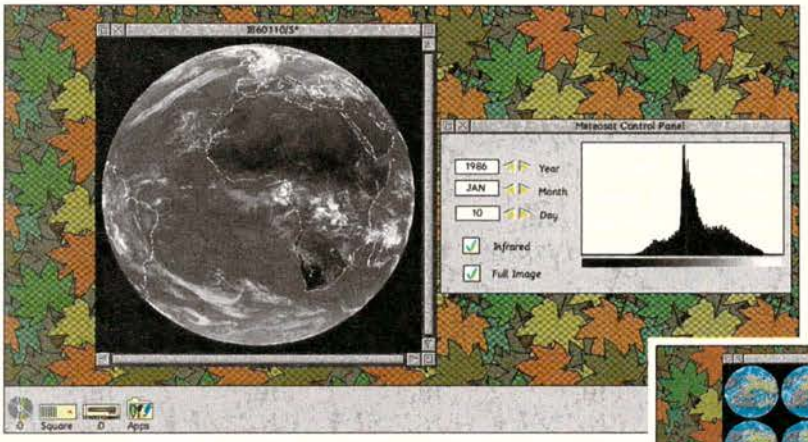
Whether you have a personal or academic interest in such information, you can now study global weather patterns over a period of five years using satellite imagery on the Acorn machine.

The software consists of three applications: Meteosat reader which automatically accesses the CD in date order and displays the image – which can also be dropped on to the iconbar for display. An optional coastal outline grid can be overlaid and the image histogram displayed. In addition, a colour palette can be added to each image to enhance different aspects. Images can be saved as sprites for further processing or printing. Furthermore, miniature images can be saved in a single file with each image being a separate sprite.

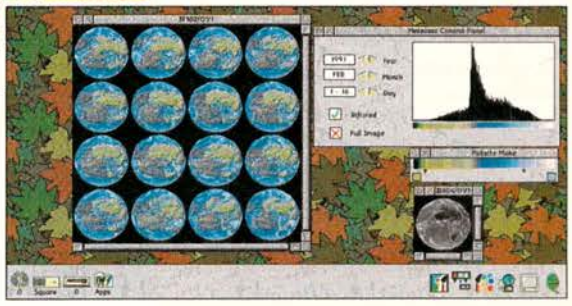
The second program is PalMake, a palette maker which allows powerful control over the displayed colours, and provides the ability to save palette files for later use. Colours may be manipulated individually or over a large range using RGB or HSV colour models.

Finally there is SpMovie which is an animation application which lets you save sprite files to be shown as a movie. Sprite files can be built up from Meteosat to form a long movie with the only limit to size being your computer's memory. In this way you can see the continual development of the weather.

To maximise the advantages in the newer machines, a separate set of applications is provided for the Risc PC and the Archimedes series.



● *What do you know about Jan 10 1986?*



● *Create an impressive presentation*

A widgit switch

FOLLOWING the launch of Make it Happen 1 by Widgit Software (01926 885303), they are already developing Make it Happen 2 to 6 to help users with severe learning difficulties access computers using switches. Each disk costs £17.50.

Make it Happen 2 offers a range of activities to develop switch control and timing skills as well as reinforcing the elementary attention, cause-effect and picture-building skills of the original program. The Make it Happen 3 package will develop the use of the double-switch function using a variety of highly attractive animated graphics. Make it Happen 4, 5, 6 concentrate on switch accuracy and help the user to master the more complicated timing required to activate different responses.

The StrongARM

THE Digital Equipment Corporation and ARM Ltd have announced that the ARM RISC architecture has been licensed to Digital Semiconductor for the development of high-performance, low-power microprocessors. Under this agreement a StrongARM family of 32-bit RISC products will be developed to complement and broaden the existing ARM product line. Full software compatibility will be kept with ARM 6, 7 and 8 chip families.

StrongARM will find a home in applications such as next-generation personal digital assistants (PDAs) with improved user interfaces and communications, interactive TV and set-top products, video games and multimedia *edutainment* systems with realistic imaging, motion and sound as well as in digital imaging including low-cost digital image capture and photo-quality scanning and printing.

The first product in the StrongARM family is already under development. Digital expects the device to be among the first products manufactured at its new FAB 6 state-of-the-art chip fabrication facility in Hudson, Massachusetts. In addition, processors and processor cores developed under this agreement will be available for licensing to other Semiconductor partners. To quote ARM's MD Robin Saxby: "This is consistent with our strategy of making the ARM architecture an open standard for performance oriented, power-efficient and cost-effective applications."

Musical express

STARLAND (01752 342080) are a company who specialise in music education. As well as keyboards they supply software aimed at school music departments and Key Stages 2 and 3 in particular. Soundtrack is a piece of interactive software developed by teachers, programmers and students led by Simon Foxall from Exeter School.

Soundtrack is divided into two programs: Music Trainer which doesn't have to be connected to a special interface or keyboard, and Keyboard Trainer which teaches the basic techniques and skills of playing a keyboard, and tests accuracy and speed.

Braille write

THE latest version of Dorton IT Support Centre's (01732 761477 x223) Text-to-Braille translation program is now available. Version 3 has been specifically designed for Acorn 32-bit machines including the Risc PC. The program accepts any ascii text file and will output a fully contracted Grade 2 braille file which can subsequently be output to a braille embosser.

You can customise the output to provide features such as grade changes and capital signs. French, German and Spanish braille codes are also supported, allowing foreign language documents to be prepared. You can also process PC files such as those in WordStar format which might be accessed from a CD-Rom. The cost is £30 or £5 to upgrade from version 2.

Talk to the world

ACORN have been demonstrating the work in progress on their network communications package, InterTalk. This aims to give access to e-mail internally on a network and via the Internet. Anyone on an Ethernet network can access InterTalk and you can create internal bulletin boards as well as access external ones. Connectivity to PC and Mac systems is also built-in.

A network administrator can allow or disallow access to sites, groups or individuals over the Internet and internally, as well as configuring the system to take account of cheap and peak rate call times enabling the site to specify when to send and receive information.

Clan Acorn

BACK in October 1994 – Acorn World – Acorn launched what is known as a *loyalty programme*. This was to take the form of a club to bring together people who use Acorn machines and those who design and make them. For a lifetime membership fee of £15 you'd receive a bag of goodies including a T-shirt, sweatshirt, product information and 1.6Mb disk of utilities, in addition to your membership card, newsletter and offers. Four months on and what is the situation?

For most people nothing else was heard of Clan Acorn. If you had access to e-mail and *comp.sys.acorn* on Usenet you'd pick up the occasional query from a lonely member. In January, Chris Cox was appointed as Clan liaison.

Acorn expected over 3,000 people to join the Clan at Acorn World. However, they only came away with around 1,000, basically because they hadn't realised how long it would take to process each individual. As finances were based on the larger number, things were put on hold. This meant delays on the membership cards, no Christmas card and the Visa card mailing going to other lists not to Clan members.

This situation could not go on, so Acorn recruited Chris Cox as Enthusiast Sales and Marketing Manager, and though he had no prior Acorn experience, he set about fulfilling the promises made in October. However, it is unlikely that Clan members will be given access to pre-release software and advance information as initially thought. The release of Acorn C/C++ has come with a 10 per cent discount for Clan members and hopefully this will be the first of many such offers. However, the first public information on this was seen on *comp.sys.acorn* on Usenet rather than via the Clan.

Chris Cox admits there have been problems due to the hiatus between the launch of the scheme and the appointment of someone responsible for it. However, February not only saw the despatch of membership cards, but promises the first batch of information – details of Acorn C/C++, Omniclient and InterTalk, a demo disk showing how to manipulate a face (first seen at Acorn World), and a series of FAQs from *comp.sys.acorn.announce* such as how to get on to Internet. Enthusiasts don't just own A5000+ machines so future information will be on 800k disks, though you will be expected to have access to RISC OS 3. If this is a major stumbling block for members Chris will look at the possibility of an upgrade path.

This is a major change of direction away from the *Risc PC owner equates to enthusiast* emphasis of the original launch. This should widen the appeal of the Clan and give Acorn a better feel for their dedicated user base.

Considering the UK-only push, around 10 per cent of Clan members are from overseas, with the majority in Holland and Germany. All information for overseas members comes directly from Cambridge – so is in English only. Once the UK situation is running smoothly, Acorn plan to market the scheme into other regions.

The Acorn Enthusiast Seminars have had a lukewarm response due to the cost of £50 and the fact that they are held during the week. The first was run on Friday February 10 and the purpose was to encourage a dialogue about the Risc PC, networking, the Internet, and C/C++. Speakers were Alex von Someren talking about the 486PC card, Dave Walker on Risc PC and Peter Bondar on general long-term strategy.

It is unlikely that the seminars will move away from Cambridge for logistical reasons, but Chris is interested in working with Acorn user clubs. So, if you are involved with an Acorn club, get in touch with him directly. He sees the main emphasis on encouraging dialogue, with himself providing information and listening to feedback on future technologies and Acorn's overall direction. Acorn hope to use this to shape their strategy: "I see my goal as facilitator not technical guru."

Chris' affiliation is to the product marketing division which is understandable as most queries are on future products. His e-mail address is *pm@acorn.co.uk* though I think it's a shame that this is not *clan@acorn....* However, for most people not on the Net, it will be what comes through their postboxes in the next few months which will determine the usefulness of the scheme.

Interactive TV — plus two

ONLINE Media's Cambridge trial has two new partners, ICL and the National Westminster Bank. Furthermore, one of the original partners – Cambridge Cable – has recently been awarded the franchise for Southern East Anglia and now has the largest geographical coverage of any cable operator in the UK. In this new phase of the Cambridge interactive TV (iTV) trial, more homes, schools and businesses will be connected via a hybrid fibre/coax cable system to digital servers.

ICL will provide a media server to handle the increase in user channels which will be required as the active user base grows, while Nat West will provide the UK's first home banking service through cable TV. This will be offered to 250 homes from mid-1995 as part of the trial.

Throughout Phase Two, additional services will be added to the existing range on offer which already includes films and documentaries on demand, news and weather, the ability to download games, home shopping and previews of forthcoming broadcast channels.

All current and forthcoming material on offer will be digitised and placed on servers supplied by ICL and ATM. These will feed through the Cambridge Cable network across switches from ATM and SJ Research to the Online Media set-top boxes.

Commenting on Phase Two of the trial, Malcolm Bird, Online Media's Chief Executive, remarked: "The Cambridge iTV Trial is the only fully digital trial of its kind running in the UK today. It is providing us with valuable experience in supplying interactive services to homes. Our set-top box design is in production, and the technology is proving itself to be highly capable. The services are taking shape and demand is growing."

Oops — sand in the works

THE screen grabs from last month's review of Eclipse's Dune II were marred by a sandstorm which infiltrated our grabbing process – or perhaps it was too much spice? This is how they should have looked. Dune II costs £34.99.

What's on

ARM Club Open Day
19 March
Merton Court School, Sidcup, Kent
Contact: (0171-624 9918)

Computers and Dyslexia
21-23 April
University of Nottingham
Contact: BDA (01737 765851)

The Midi, Electronic Music and Recording Show '95
21-23 April
Olympia 2, London
Contact: Future Events (01225 442244)

Acorn User Show
6-7 May
Harrogate International Centre, Harrogate
Contact: Safesell (01737 814084)

(*) Northants Acorn Group
Second Monday each month: 7:30pm
Co-op Hall, Havelock Street,
Desborough, Northants
Contact: T Cowley (01536 762713)

Acorn reproduction

A NEW Acorn venture was announced recently with the aim of focussing on an increased number of graphic arts sectors including larger repro houses, publishers and graphic designers. To this end, Acorn have recently signed a distribution agreement with electronic imaging distributor Rapitech to specifically target the printing, publishing and reproduction sectors following their successful partnership with AB Dick-Itek.

In addition, Acorn has added ECRM as a partner. ECRM are a leading image setter distributor in Europe and Acorn hope that this will result in increased distribution for Acorn Publishing Systems on the continent.

Impressive WWW

THE World Wide Web uses a special format of text called HTML – Hyper Text Mark-up Language. On Acorn machines this can be time-consuming to put together and you have to learn lots of obscure syntax. But, if you have a copy of Impression Style, Publisher or Publisher Plus, you can now author HTML pages and mark-up existing documents easily.

Ben Summers has released shareware HTML tools that extend the Impression family allowing seamless and intuitive creation of Web pages. You can get an unregistered version via e-mail from *ben@cconcepts.co.uk*, or by sending a disk and return postage to Ben Summers, 1 St Clements Hill, Norwich NR3 4DE.

Serious statistics

REGARDING the review of 1st which appeared in the January issue of *Acorn Computing*, the full specification package is priced at £205 with an education price of £164. There is an *Elementary* or *Learner* version which costs £70 or £50. The 1stJr variant is £105 with an education price of £84 and is the most popular school package at present. Full details are available from Serious Statistical Software (0151 327 4268).

Cartoons on-line

THE European Cartoon Arts Network have launched your favourite cartoon and comic strip characters on to the Internet. You can explore CartooNet on the World Wide Web at http://www.pavilion.co.uk/cartoonet/.

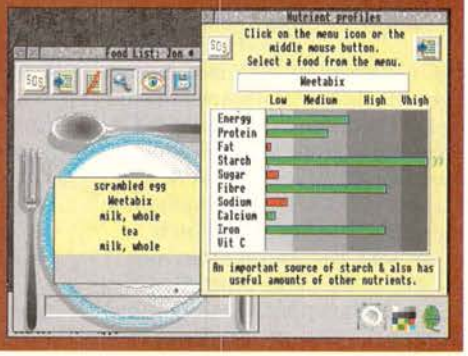
CartooNet will link cartoonists and cartoon organisations all over the world and raise the profile of European cartoon arts, strip illustration and graphic novels against the huge wave of imports from America and Japan. The Network is sponsored by Sussex-based Pavilion Internet plc and supported by the European Union through the Kaleidoscope Scheme.

Food news

HAMPSHIRE Microtechnology Centre (0705 378266) have released DietGuide. This aims to introduce pupils to the concept of a healthy diet by providing comments on their choice of foods. This complements the earlier Nutrients which is a comprehensive diet analysis package.

DietGuide encourages Key Stage 2 children to enter foods and the *Professor* will comment on the adequacy of their diet. The aim is to help children recognise the relationship between their health and the intake of food, as well as making them aware of current dietary guidelines.

DietGuide contains details on over 300 foods and uses the Royal Society of Chemistry's data for the nutrient content of food and the latest Dietary Reference Values.



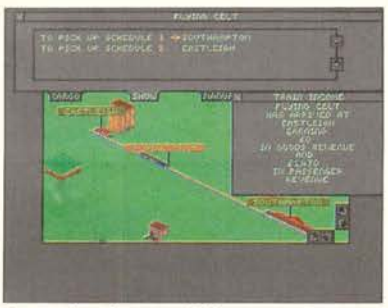
● *What is good for you?*

Up to speed

UK Software are about to release Land, Sea and Air – a sequel to Days of Steam. This simulation package sets you the challenge of running an airline, railway, shipping line or football team against computer-run intelligent opponents.

Featuring three dimensional isometric graphics and animations, the price is £19.95 and is only available by mail order to RISC OS owners. For more information contact UK Software, 38 Midlands Estate, West End, Southampton SO30 3AD.

● *Work on land...*



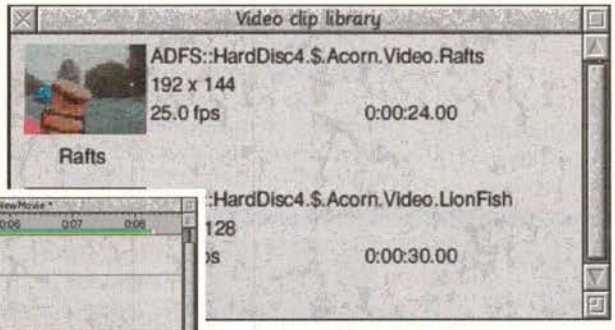
● *...using its own GUI*

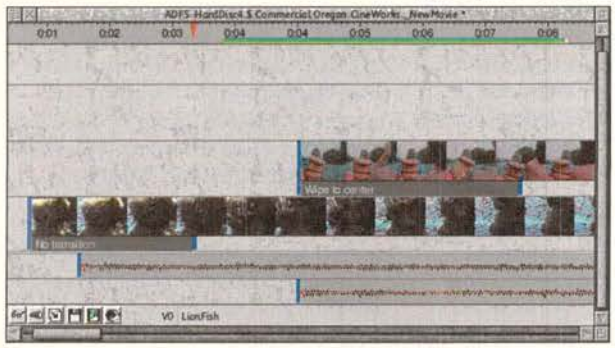
Moviewatch

LATEST release from Oregan (0121 353 6044) is CineWorks which provides a 32-track video mixing and editing studio with 16-track audio capabilities. You can mix MPEG and Replay video clips using a variety of transitions usually only found in professional editing environments, ranging from standard wipes to central zooms and mosaic cuts. The cost is £160 inc VAT and is loosely based on Premier on the Apple Mac, making it a mix of Empire and Eidoscope for Acorn users.

Other facilities on offer are zoom, panning, rotation, shadowing, ghosting, chroma-keying and opacity control. Full vision correction controls are also provided so you can adjust the brightness, colour and contrast of your Replay and MPEG clips at any time, and even vary these through the clip.

CineWorks can be used to create genlocked overlay graphics for titling. The genlock has 16 levels of transparency and supports all popular Acorn genlock hardware as well as video capture cards such as the Eagle M2 and Irlam cards. Oregan also provide a free CD-Rom with a variety of video and audio clips to start you off.





Second processor –

My other computer is an Acorn. Steve Turnbull reports on the long-awaited Risc PC 486 PC card

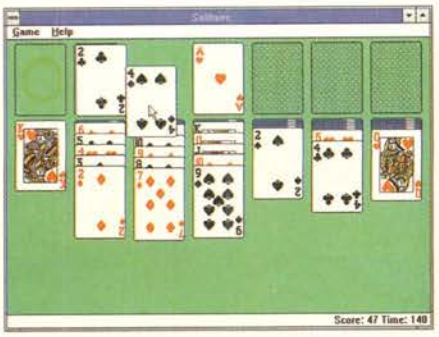
PC COMPATIBILITY is not new to the Acorn platform – Master 128 owners have been able to access DOS since the 1980s, and don't forget CP/M for the BBC B. PC Soft was the official name for the software emulator which came with the Archimedes, but *real* PC access came with Aleph's PC cards. It is Aleph One that has created the Risc PC 486 Card and is continuing to develop faster variants. The beauty of the Risc PC is that a second processor is integral to the design, and can be added as an upgrade at a low price.

PRODUCT SPOTLIGHT

Product: Risc PC 486 Card
Price: £199 (or £99 if purchased with Risc PC)
Suppliers: Acorn dealers
Availability: April 1995
Requirements: Risc PC with required memory (at least 5Mb), and disk space (at least 100Mb), for PC applications and operating systems

In the simplest terms, the Risc PC 486 Card is an upgrade card which slots into one of the two processor slots in your Risc PC. You then treat this in exactly the same way as you would a 486 PC, allowing you to run Windows or DOS software on your Risc PC. The upgrade consists of a 33MHz TI 486 SXL chip, a printed circuit board and an ASIC which provides the interface between the 486 chip and the Risc PC.

What about the speed? Access and usage speed of PC applications is about the same as a relevant 486 PC – some faster, some slower, some the same. In most cases the difference is negligible and won't be noticed by the majority of users.



● *Patience is a virtue – even with Windows*

Interestingly, Acorn report that some Windows applications actually run faster on the 486 card than on a standalone 486 PC. This seems to be true when it comes to graphics intensive tasks.

IBM's PC DOS comes with the card, but if you prefer you can install DR-DOS or MS-DOS. Windows doesn't come as standard with the boxed card at present. However, Acorn are looking at the possibilities of including optional OS/2, Windows and SCO UNIX operating systems.

It has to be said that when trying to run two software packages *other* than that supplied by Acorn, I ran into difficulties – the programs didn't like PC-DOS.

Fitting it in

The unit is plugged into the processor slot that the ARM610 usually sits in. This is moved to the other slot – it runs there quite happily even without the PC card – towards the back of the computer. Successful fitting can be carried out by anyone, as all that is required is to lift the lid and insert the card – no tools or expertise needed. Installation time is about one minute if you take it carefully.

The 486 Card comes with a front-end program so you can run PC software within a window in the RISC OS environment or in full-screen mode. The software is configurable for whatever Risc PC hardware you're using.

However, you will need to check your memory and hard disk requirements. You can run DOS programs on a 5Mb machine, but you'll find running Windows programs is slow and inefficient – upgrade to 9Mb. The front-end software will have to be configured with the amount of memory you intend to allocate to the PC card. Also you will have to partition your Acorn hard disk for PC programs, including the operating systems, and you'll still need to load DOS even if you're running Windows.

You can allocate up to 7Mb to the PC/Windows environment, but 6Mb is probably more sensible and allows a better balance between the two computing environments – PC and RISC OS.

The reason for this is that Windows is a very hungry operating system – no more OS in rom I'm afraid – and the speed at which the program runs can depend on the total amount of available memory. When setting up your Risc PC remember that base-level PCs are looking for 8Mb of memory as standard.

If you want to run Acorn applications at the same time then you have to think in terms of 12Mb or more of ram. The basic principle is: add as much memory as you can afford.

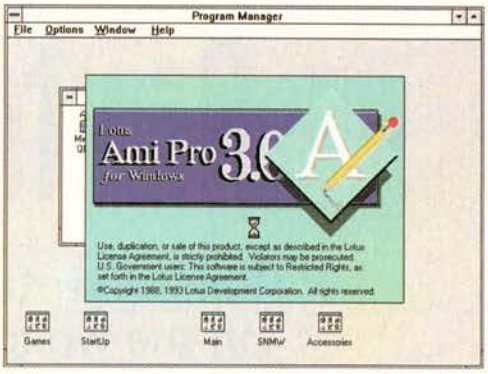
The 486 Card supports 640x480 and 800x600 screen resolutions – VGA and SVGA – though higher resolution may be used in Windows. 16 and 256 colours are supported in Windows, but only 16 colours under DOS. However, later releases of the software promise improvement here – and as these are software upgrades, this shouldn't prove to be too difficult.

How it works

Apart from providing the 486 processor, the PC card itself has to perform two other main functions: it has to provide the arbitration to allow the two processors to share the system, and it must provide the conversion between the signals that the 486 expects to find on the ends of its pins and what the Acorn system actually provides. Both these functions are achieved with the Gemini ASIC chip.

Another requirement of a typical PC is a secondary ram cache. You're probably familiar with the concept of the ram cache that is built-in to the ARM3 and later chips. This allows faster access to instructions and data in memory by storing them in a *cache* which is faster to access than the main memory – as long as the data is only *read* from

second computer


Program Manager
File Options Window Help
Lotus
Ami Pro 3.0
for Windows
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Games
StartUp
Main
SNMW
Accessories

● *Business programs from the PC can be integrated into your Acorn*

the cache the processor can keep accessing it quickly.

The x86 range of processors have a cache on-board, but because of their archaic design, they also have to have a secondary cache so that they can run fast enough. The secondary cache is typically 256k or more. On the PC card, Acorn have allocated a 256k secondary cache.

PC additives

You can access the plethora of PC CD-Roms, but if you want the sound you'll have to fit a Risc PC 16-bit sound card and use some Soundblaster emulation software which will be available in April. Not all CDs will run, but this is due to the innate problem of CDs in the PC market rather than a problem with the Risc PC 486 card itself.

However, if you opt for MPC compliant titles you should have no problem. Sound input is not supported and there is no implication that it will be. The same is the case for mixing and joystick support. When it comes to PC games you may also run into the same problems as PC clones – remember some PC products are more PC-compatible than others.

The future

Acorn have hinted that other companies are developing PC cards for the Risc PC, while Aleph One is planning an enhanced PC Card based on a higher specification and more expensive 486 chip, as well as a Power PC chip device. Acorn too is evaluating Power PC capability, and its closer links with IBM over the last year should facilitate this. However, this would not allow access to Apple software due to licensing costs, and Apple's failure to comply with the PReP (Power PC reference) standard. However, third party developers have not given up on the possibility of an *Apple Card*, since Apple has begun to licence its operating system as Mac OS.

Acorn are committed to producing ASIC release 2 with a write-back secondary cache controller and support for 512k Secondary ram, dirty cache buffer, deeper open bus write buffer, burst mode controller as well as PIN compatibility. Not all these options are essential, but with a very untypical *what the hell* attitude, Acorn is clearly aiming to implement anything that makes its PC card run very fast indeed. The improvements will allow use of more powerful processors.

On the software side you can look forward to later releases featuring shared memory window drivers, 24-bit colour drivers, OS/2 driver support, tighter Windows/RISC OS integration, and *hot pipelines* which will allow data sharing between applications on the different processors.

Benchmarks

In the comparisons given here, the Apple PowerMac/PowerPC SoftWindows product is included. The cost over a basic PowerMac is more than £1000 because you have to add lots of extra memory, and it can't run alongside the standard Mac software.

Its inclusion may seem unjustified – since it can't possibly stand up to dedicated hardware – however, on the one hand it highlights the inaccuracies of benchmarks and on the other Apple have made some rather extravagant claims for it.

Windows User Benchmarks 1.0

	Processor	Memory	Graphics	Disk Access	Windows	Overall	Time taken
486 PC/4Mb 640x408 screen 256 colours	9.5	11.7	8.2	18	9	10.8	1.15
Apple PowerPC/Soft Windows 640x408 screen 16 colours	4.3	11.3	44.8	3.2	5.3	8.2	4
Apple PowerPC/Soft Windows 640x408 screen 256 colours	4.2	12	31.9	3.3	5	7.7	4.08
Risc PC 486 PC Card/8Mb 640x480 16 colours	4.7	4.5	8.3	9.8	7.4	6.6	1.45
Risc PC 486 PC Card/8Mb 640x480 256 colours	4.7	4.5	6.8	10	7	6.3	1.52

● *The results for the Power PC/Soft Windows combination vary wildly. The lowest figures recorded being 24.1, with the highest 85. Therefore at best this would indicate 8.5 times better performance than a good 486, which is unlikely when compared to the timings of the other test:*

WinTach Benchmarks 1.2

	WordPro	CAD/Draw	Spreadsheet	Paint	Overall	Time taken
486 PC/4Mb 640x480 256 colours	3.82	5.58	4.16	4.20	4.44	1.27
Apple PowerPC/SoftWindows 640x480 256 colours	1.8	3.62	3.96	4.54	3.48	2.38
Risc PC 486 PC Card 640x480 256 colours	2.56	3.22	3.92	3.4	3.28	1.56

Raytracing for beginners

Rob Miller takes the lid off the wonderful world of raytracing

WHENEVER you turn on the television or go to the cinema to see the latest sci-fi blockbuster, you're likely to come across the results of raytracing. What was once a highly specialised field, restricted to only the most dedicated (and richest) computer users, is now one of the most common and popular techniques for producing high quality, photo-realistic images.

The basic principles behind raytracing are quite simple. A model of the scene to be drawn is held inside the computer as a group of three-dimensional co-ordinates, and the path of one (or more) light source/s is calculated until it *emerges* from the screen – see Figure I – although it's worked out backwards. Objects can be given different attributes, such as reflective, transparent and so on, which affect the way in which light travels around the scene.

Using different mathematical formulae, virtually any three-dimensional shape can be modelled. Mathematical formulae are also used to define the surface of a shape – whether it is shiny or matt for instance. Single shapes such as cubes, spheres and cylinders are referred to as primitives and can be combined together to construct more complex shapes. In a similar but opposite way, holes can be cut out of objects by *subtracting* one object from another.

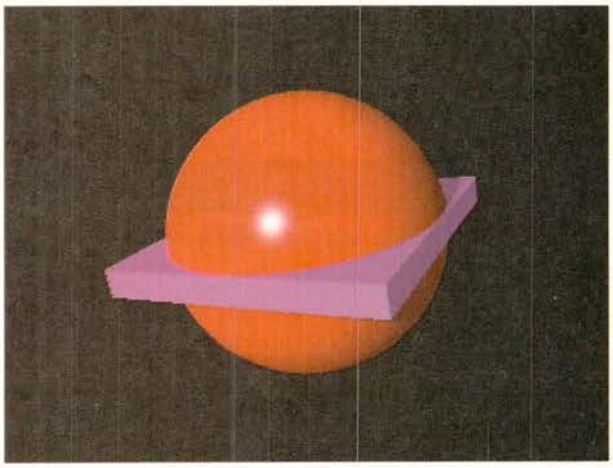
Most raytracing programs use a special *language* much like a programming language such as Basic or C to describe the scenes to be drawn. Some programs also allow the user to create scenes using a three dimensional editor, doing away with the need to learn the language. 3D editors also have the benefit of allowing the user to visualise the scene before it is raytraced.

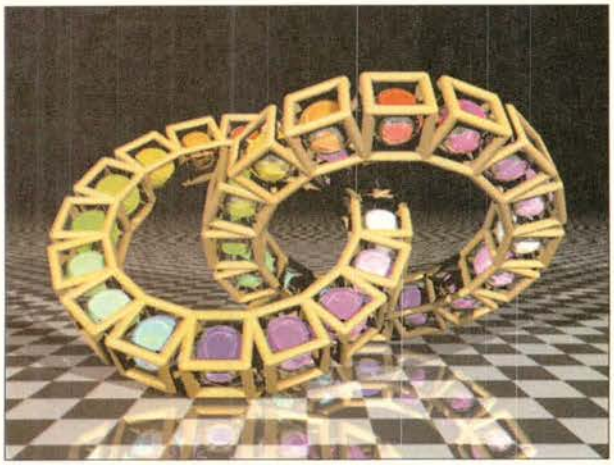
When a scene is actually raytraced, the description file – or 3D file – is translated or *parsed*, much in the same way as a compiler might convert a program. This produces a sequence of instructions that can be directly acted on by the raytracer. The finished scene is then produced pixel by pixel, line by line.

The time taken to raytrace a scene depends on a number of factors. First, it's no good thinking that a less capable machine is going to produce high-resolution, 24-bit colour pictures in seconds. The more powerful your computer, the quicker a picture will be drawn. As a guideline, it will take approximately four hours to render an *average* scene at 640 x 512 in 24-bit colour on a machine such as the Acorn A5000.

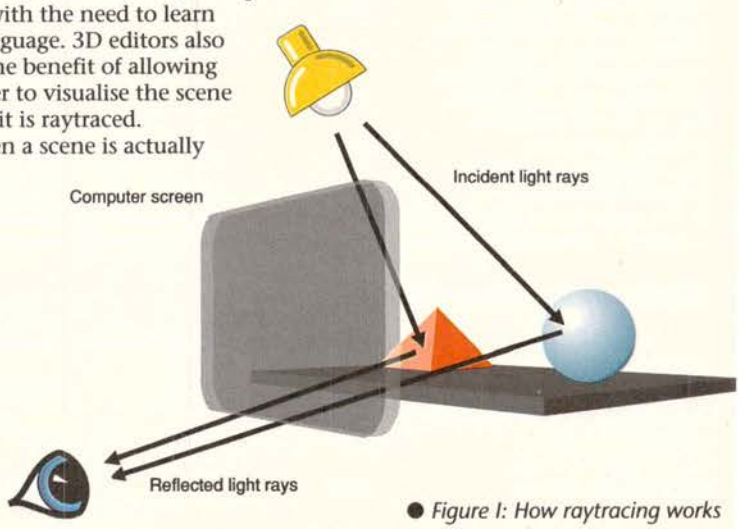
Due to the large amount of mathematics involved in computing a scene, the addition of a Floating point co-processor in your machine will noticeably speed up the process of raytracing. Some raytracing programs are even coded as two versions, one for those with and one for those without an FPC. The difference between two such

● *An example of constructive solid geometry*





● *A full screen, 24-bit image created with Merlin*



● *Figure I: How raytracing works*

programs can sometimes be a speed increase of up to 10 times in favour of the FPC version.

When a picture is rendered it is usually output either as a bitmap image, a file or as both. In the case of a file, most raytracing programs are capable of producing 24-bit colour scenes, even if the computer they are being run on is incapable of displaying them. In this situation, some kind of picture converter such as ChangeFSI or Translator can be used to change the file into something that can be viewed.

At high resolution, on a good monitor, it can be quite difficult to tell an 8-bit image from a 24-bit image, apart from a slight graininess in the latter. On the printed page however, the difference is very noticeable as can be seen from the pictures in this article. The Fishtank picture for example is 8-bit while the Colour Rings picture is 24-bit.

Merlin – German magic

There are many raytracing packages available for Acorn machines, both commercial and public domain. One of the most recent of these is Merlin from German software company Evolution Computer. It is in fact an updated version of Powershade which in turn is based on the multi-platform program RayShade. Powershade incidentally, was to have been marketed by the now defunct Arxe.

PRODUCT SPOTLIGHT

Price: £100
Supplier: Evolution Computer, Westfählische Straße 51, 57462 Ople, Germany.
Tel: 0049 2761 6707
Requirements: RISC OS 3

At present Merlin is still in its final stages of development, but it should be available as a commercial product in time for the Harrogate Acorn User Show in May. The main bulk of the package (the actual renderer) is complete, and the pictures on these pages give some idea of what it is capable of. A 3D editor forms the rest of Merlin and will, in its completed form, allow you to create and visualize scenes using simple wire-frame graphics.

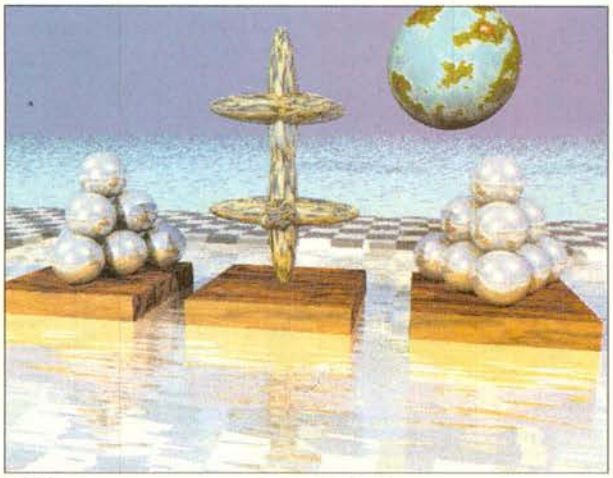
Merlin is fully RISC OS compliant and thus runs as usual on the desktop. The editor is entirely icon-driven and creating a scene is as simple as selecting an object primitive and then positioning it in 3D space. At the moment, quite a few of the icons are ineffective and so creating a complete scene using the editor is impossible. Not quite *vapourware* but more some kind of intermediate state such as *liquidware*.

For the time being, the only way of creating a finished scene is by writing a description file, detailing what objects are to be used and where they are to be positioned. As Merlin is directly related to RayShade, there is plenty of documentation around on how to write description files, both for the beginner and advanced user. Also, a few example files are included with Merlin which help you figure out what's what.

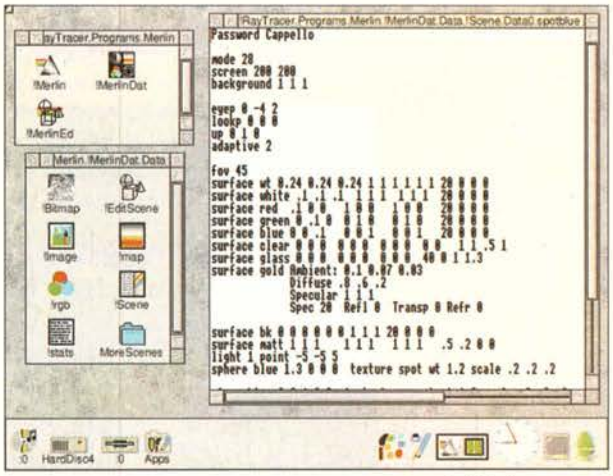
I don't profess to be a particularly capable programmer, but I soon managed to knock together a scene. Like learning anything new, it takes a while to get used to the description language, but anyone with a broad knowledge of Basic or C should have no problems creating their own description files. I found the best way to learn how things work is to play around with existing files, changing a few parameters to see what difference it has on the finished image.

Once you have your scene, it can be dropped directly on to the *engine* part of Merlin – the application that does the actual rendering. There are two stages to this, compilation and rendering. The description file is first compiled into a form that the renderer understands, much in the same way as a C compiler might. This file is *passed* to the renderer.

Before rendering begins, you have the chance to alter a number of settings including the picture dimensions and field of view. The time taken to render the scene depends directly on the quality of the resulting image you wish to achieve. Shadows, for example, can be turned on or off, as can object's



● *Effects such as water are easy in Merlin*


!RayTracer.Programs.Merlin
!Merlin
!MerlinDat
!MerlinEd
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!Bitmap
!EditScene
!Image
!map
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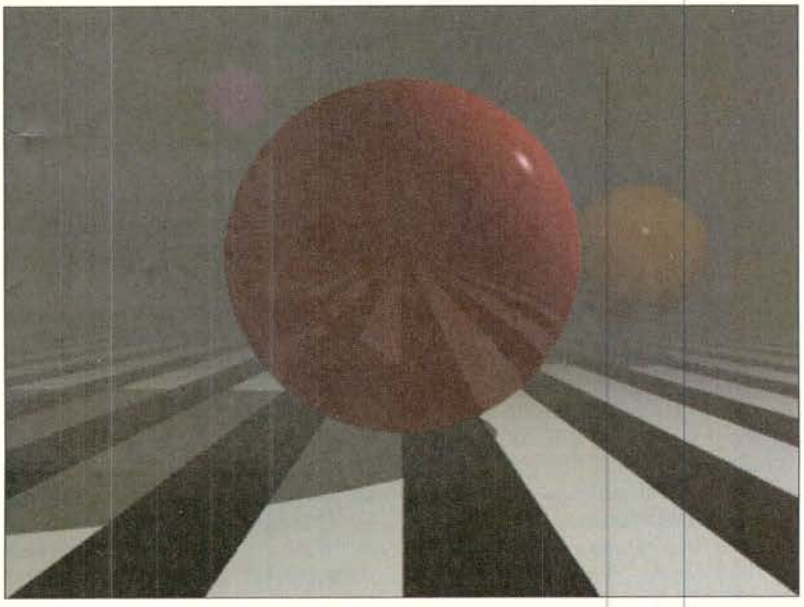
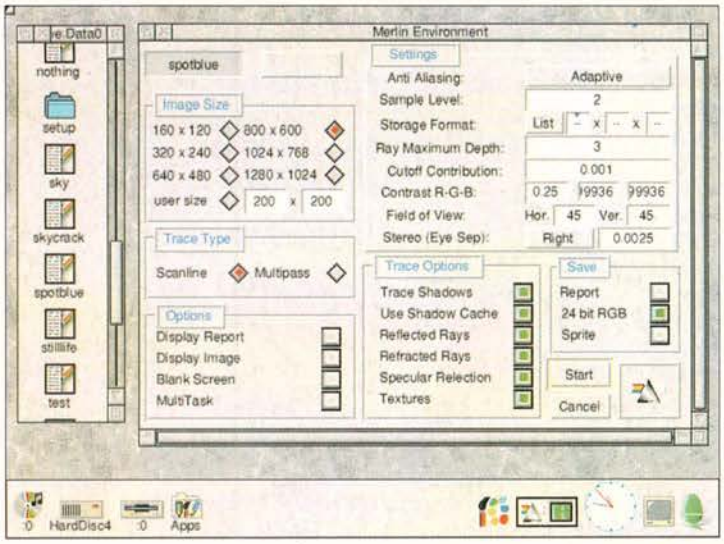
!stats
MoreScenes
!RayTracer.Programs.Merlin.!MerlinDat.Data.!Scene.Data0.spotblue
Password Cappello
mode 28
screen 200 200
background 1 1 1
eyep 0 -4 2
lookp 0 0 0
up 0 1 0
adaptive 2
fov 45
surface wt 0.24 0.24 0.24 1 1 1 1 1 1 20 0 0 0
surface white .1 .1 .1 1 1 1 1 1 1 20 0 0 0
surface red .1 0 0 1 0 0 1 0 0 20 0 0 0
surface green 0 .1 0 0 1 0 0 1 0 20 0 0 0
surface blue 0 0 .1 0 0 1 0 0 1 20 0 0 0
surface clear 0 0 0 0 0 0 0 0 0 1 1 .5 1
surface glass 0 0 0 0 0 0 0 0 0 40 0 1 1.3
surface gold Ambient: 0.1 0.07 0.03
Diffuse .8 .6 .2
Specular 1 1 1
Spec 20 Refl 0 Transp 0 Refr 0
surface bk 0 0 0 0 0 0 1 1 1 20 0 0 0
surface matt 1 1 1 1 1 1 1 1 1 .5 .2 0 0
light 1 point -5 -5 5
sphere blue 1.3 0 0 0 texture spot wt 1.2 scale .2 .2 .2
HardDisc4
Apps

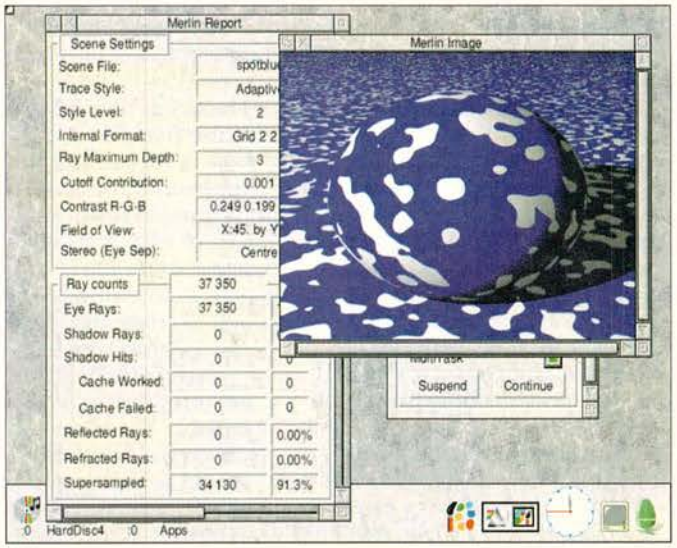
● *Writing a scene description file in Edit*



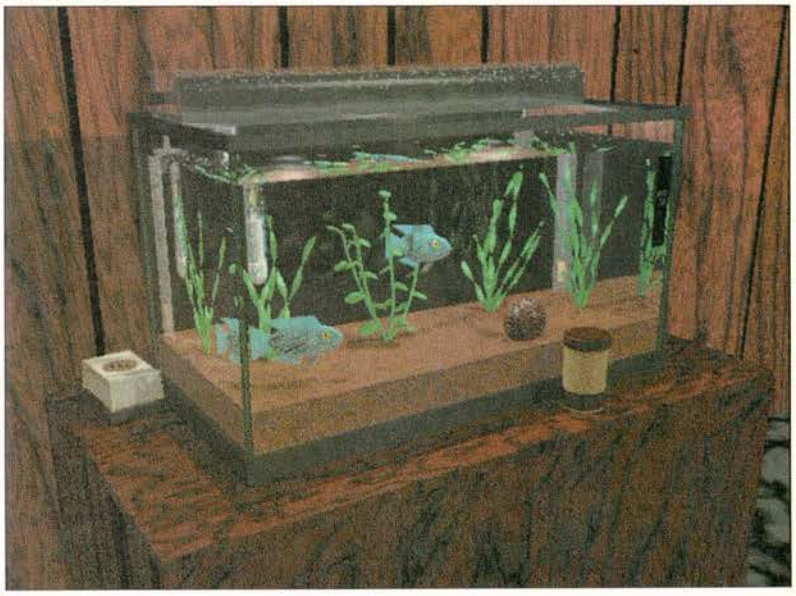
● *Simulating fog is also possible*



● *Setting up parameters in Merlin*



● *Rendering a scene in Merlin*



● *An 8-bit file looks fine but it can't beat 24-bit colour for clarity*

➤

textures. Calculating the path of light when it is reflected off or refracted through another object can take a considerable time and these two options can be toggled on/off to speed up the process of rendering.

When you're happy with the settings, you can begin the raytracing proper. As Merlin runs in the desktop, it is naturally a multi-tasking program. You can however set the amount of time that Merlin uses the processor. With the multi-tasking option switched on, Merlin runs happily in the background albeit a little slowly, without interfering with any other applications. With it off, Merlin will still co-exist with other programs, but things can get a bit sluggish.

While raytracing takes place, a copy of the image can be displayed on screen to monitor the progress of rendering. One handy hint here if you happen to be using Merlin or plan to buy it, is to render a scene at, say 100 x 120, which gives just enough detail to check whether everything in the image is as planned. When you are happy with the result, you can then render the scene at full screen size.

As I've already mentioned, rendering a picture can take some time. If you're producing a full screen image of a scene of average complexity, you can expect a wait of about two to three hours. Some scenes will take less time, but a complex scene can mean having to leave your machine on overnight, or even for a number of days.

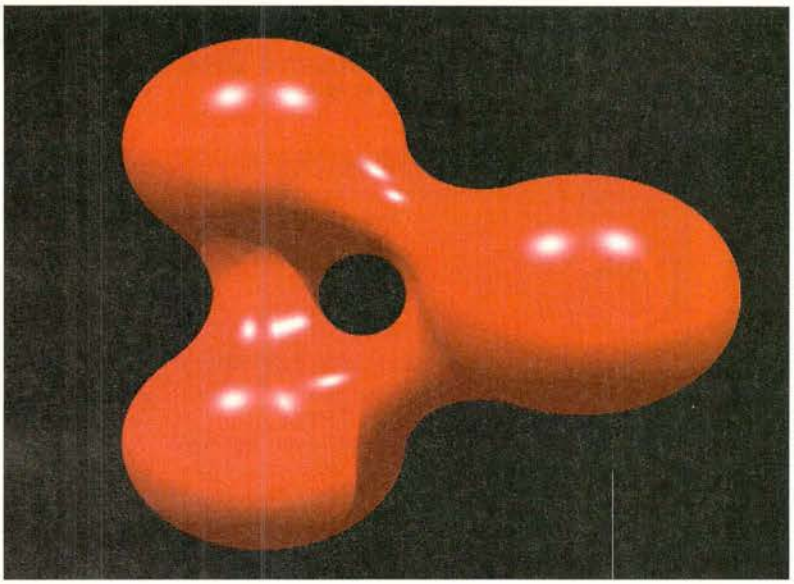
There are two types of picture file that Merlin can generate, namely 256 colour sprites, and/or 24-bit RGB files. The sprites are standard Archimedes picture files and can therefore be viewed on any Acorn 32-bit computer. RGB files are similar to Clear files in as much as they are a sequence of values, defining the colour of each pixel on the screen. The benefit of these files is that they can be converted to any colour resolution from monochrome to full 24-bit (16.7 million) colour.

Most of the pictures on these pages have been generated as 24-bit images and the results speak for themselves. On a machine such as the Risc PC fitted with the full 2Mb of video ram, the images look truly stunning and really give you a good excuse for buying one of these top of the range machines. Similarly, computers fitted with graphics accelerators such as those from Computer Concepts or State Machine, will give equally impressive results.

Summing up

Merlin is an extremely capable raytracing package and should appeal to anyone with an interest in state-of-the-art graphics. Spending money on a piece of software when there are similar programs in the public domain – such as POVray – might not seem such a good idea, but as far as I am aware, none of these has an accompanying 3D editor like Merlin.

In its unfinished state, it's difficult to pass judgement on Merlin, but if it gets all the features that are promised, I would certainly recommend it. The new Acorn machines are already attracting some excellent graphic design software and this is another package which can be viewed in the same light.



● *Blobs count as primitives*

Adventures in Raytracing: Hermida

Raytracing is now a very popular activity, especially on platforms such as the PC clone. There are a number of books on the subject which introduce the various concepts and techniques used, and one of the best is Adventures in Raytracing by Alfonso Hermida. Unfortunately this is aimed at PC owners but there is much in the book which is applicable to any platform.

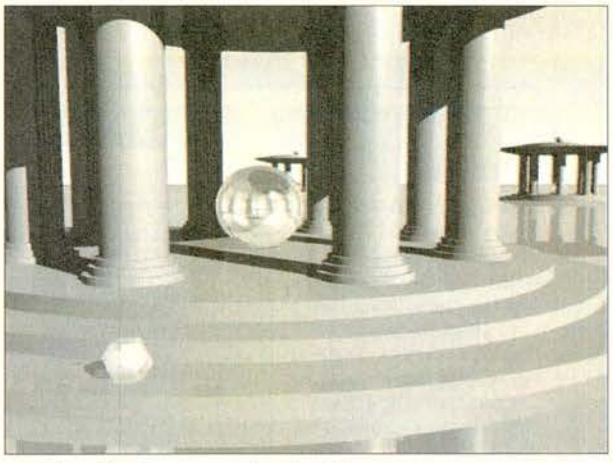
If you have a PC card fitted in your computer, you will obviously get more out of the book, and it even includes a floppy disk containing a complete 3D editing and raytracing package – written for DOS or Windows. I didn't quite get time to try the programs out – my PC card for my Risc PC still hasn't arrived – but through the pictures and description in the book, they certainly seemed to be good pieces of software.

Like most computer books, Adventures in Raytracing is expensive; £26.40 for a 300 page paperback. You do get the *free* software though so it's not as bad as it sounds. At the moment there are no books on raytracing specifically for Archimedes users, but with software like Merlin becoming available, such a book might appear soon. For now though, Adventures in Raytracing is a good place to start if you want to get into some serious raytracing.

PRODUCT SPOTLIGHT

Price: £26.40
Publisher: QUE
ISBN 1-56529-555-2

● *A scene rendered in Persistence of Vision (POVray), a PD raytracer*



● *Escher-like images are simple with a raytracer*

From here to infinity

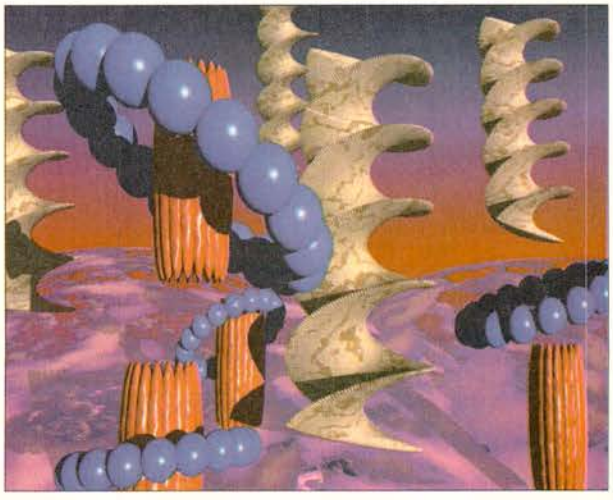
While it's common for people to consider raytracing as the final word in computer graphics, this certainly isn't the case. For a start it's not very good at soft shadows and indirect lighting – any ambient lighting is still considered as having no source.

For example, it would be difficult to produce a natural-looking scene that was lit by a bright light behind a polystyrene tile.

However, there is a technique known as Radiosity that can generate the most lifelike scenes because even the ambient lighting comes from somewhere – in fact lots of places, after all it is *ambient*.

The main difficulty with Radiosity is that it takes a vast amount of processing power to produce images, so for the time being, its use is restricted to mainframe computers.

But as the processing power of desktop computers increases, it won't be too long before pictures rendered with Radiosity are as common as raytraced ones.



● *Another scene from POVray*

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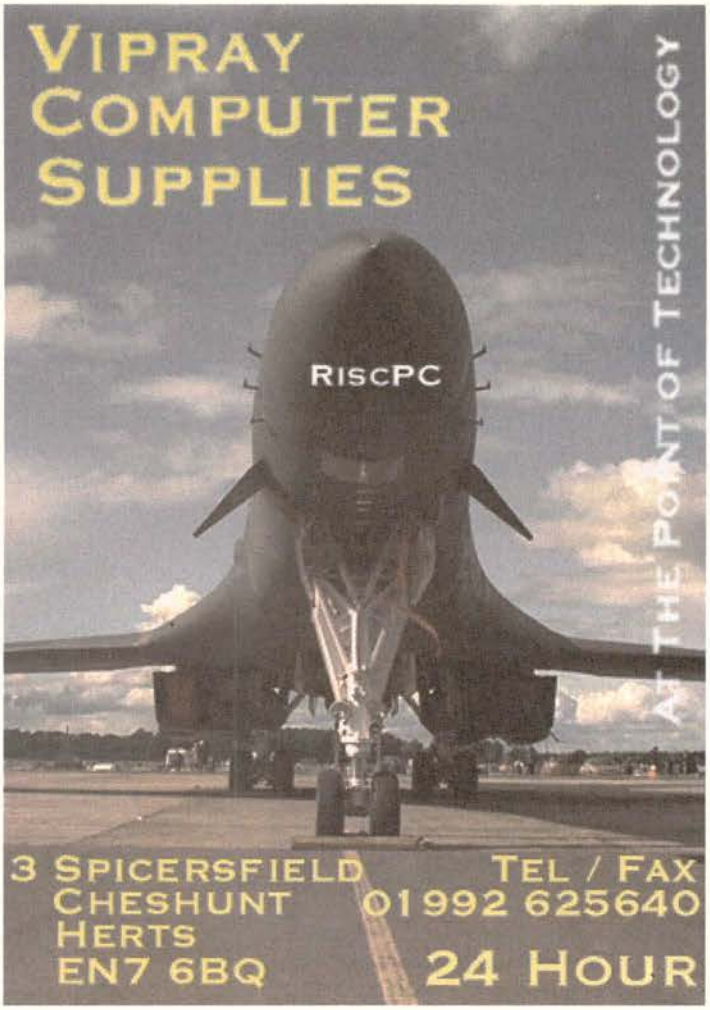

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The short list

Clem Vogler and Pam Turnbull look at a selection of programs to make your life easier

WE get a lot of letters at *Acorn Computing*, many of them beautifully word processed or desktop published and laser printed. The faultless spelling attests to the literacy of our readers, or at least confirms that they have found the spell-check button. Occasional bizarre vocabulary suggests that a few are regular, if indiscriminating, users of the thesaurus. But, funnily enough, most of the envelopes are handwritten.

Why should this be? Well, sometimes the label-generating bit of database software isn't all it's cracked up to be. Labelling software needs to:

- be fully configurable to your label stationery, with options to set column width, row height, left margin, top margin and number of labels across sheet
- allow you to concatenate fields correctly formatted, without inserting field padding spaces
- avoid leaving blank lines if one or more address fields are blank
- enable you to select which fields in a record are to appear in the label and in what order
- enable you to print a set of labels for a sub-set of your records, including just one label for a single record
- identify the next vacant label on your stationery, which may not be the one in the top lefthand space
- be configurable for salutation, so that you can send to Mr M. Mouse or Mr & Mrs M. Mouse or Mr & Mrs M. Mouse & Family
- include an optional field like a business name.

The ideal arrangement would ensure that, once you have selected your sub-set of addressees, a single key stroke or mouse click should generate the corresponding labels. Even this might be considered excessive – if the database has already personalised the letter, you could demand that the act of printing the letter produces the label simultaneously.

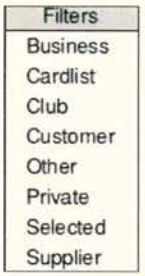
Most database programs have a label printing facility in their reporting options, but they duck the important issue of finding the next blank label. So, I was pleased to come across LabelStar, a dedicated labelling program, which allows you to find the next free label on a partly-used sheet. Other features of LabelStar are:

- An effective (despite lacking a screen painter) label designer, with adjustment for a wide range of stationery, row, column, margins, pitch and sheet size
- Text or graphics options allow you to choose between rapid printing with your printer's internal fonts and slower, more elaborate creations with dragged in draw files and scaled fonts
- Printing from RISC OS or turbo drivers
- A flat file database with modest search and sort facilities and two indexed fields – surname and postcode
- Scrolling toolbar access to main functions
- *Mimic* display previews your design
- Import and Export facilities for text and CSV files.

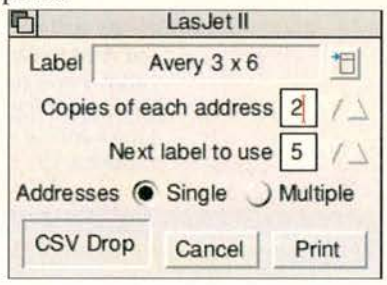
The fixed length fields can be enlarged without corrupting existing data, but the number of fields is fixed at four: name, address, postcode, country, and only a single (string) data type is allowed.

Whether you can effectively import or export data between LabelStar and other programs depends, of course, on how the relevant fields and records are organised. When I imported addresses from a Squirrel database, the fields were in the wrong order and the limited editing capabilities of LabelStar were not up to re-arranging them.

Of course, I could have set up my Squirrel database with a single multi-line address field to overcome this – with some loss of search and sort flexibility. Drag and drop exporting of addresses into



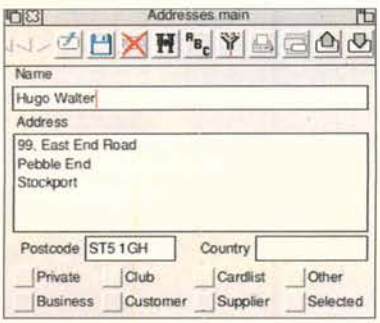
● *Category sorting*



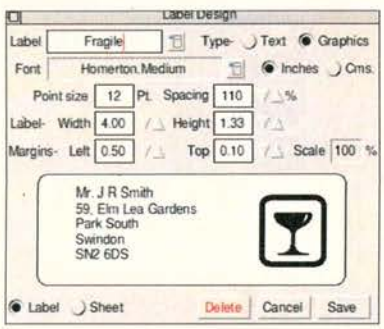
● *Easy printing: Any number, any position*

PRODUCT SPOTLIGHT

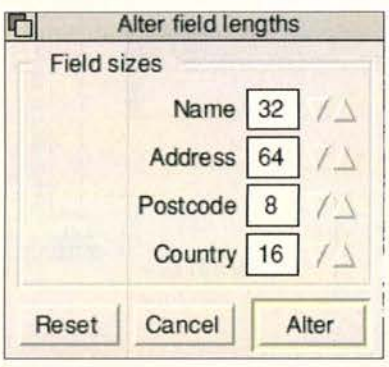
Product: Label Star
Price: £35 (inc VAT)
Supplier: Circle Software, 33 Restrop View, Purton, Swindon, Wiltshire SN5 9DG.
Tel: 0793 770021



● *Report frame and toolbar*



● *Label designer – with supplied graphic*



● *Editing field lengths*

➤
Impression and Edit was quick and easy.

Importing from a word processor was a bit more cumbersome and restricted to mapping one block of marked text to a field. To make it easy to use, LabelStar has been designed with a single address field which makes it awkward to import from databases with multi-field addresses. There is no phone number field so you would not be able to use the underlying database with an autodialler.

I found the implementation of RISC OS conventions a bit untidy, with the Return key not moving between fields, and the Tab key suppressing keyboard entry.

You quickly get used to using cursor keys instead. When I selected a font which wasn't on the path, I was consigned like the victim in 1984 to that which I loathe most – the inescapable error box.

● *LabelStar does not represent an adequate substitute for a fully featured database manager – particularly if you want to integrate your database with other applications – which I regard as the Holy Grail of business computing. For its intended use as a stand-alone labelling application, however, it can be confidently recommended.*

Smart CD+: DIY DJ

WITH more people adding a CD-Rom drive to their Acorn machines – and one that has the ability to play audio CDs – Ian Giblin has revised his freeware SmartCD application into the commercial SmartCD+. In simple terms this allows you to catalogue and record your CDs, choose favourite play sequences and even arrange for the best organisation on to audio tape with inlay. As the manual states, this is not for piratical purposes, but for convenience – not many people have a CD player in their cars as yet.

You may have to configure your CD system – set the number of drives the computer recognises – but this is simple to do and a text file will guide you through this.

Initially the window will not recognise any CDs and a box will read *Disk not identified*. Replace this with the name of the CD, open the window to its full extent and enter the names of the tracks. Save this and the program will recognise the CD next time you pop it into the drive.

As well as the ability to play, pause, play the previous or next tracks, rewind, fast forward and stop, the ? icon allows you to ask the drive what CD is in it at present. You can program a sequence, loop, eject and save the track listing as a text file, and all this without even clicking the Menu button.

PRODUCT SPOTLIGHT

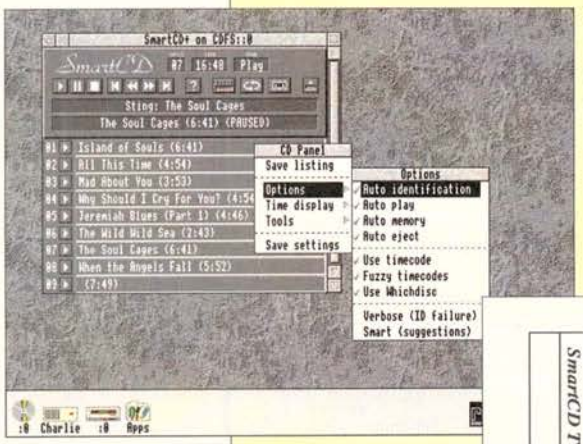
Price: £10 (inc VAT)
Supplier: ARM Club, FREEPOST ND6573, London N12 0BR.
Tel: 0171 624 9918
Requirements: RISC OS 3

The options sub-menu gives you a variety of options, some of which you may never need, and in fact the only flaw with this program – if it can be called such – is that there are just too many options for most people. A sample of what is available starts with *auto identification* which means that the program constantly polls the player in order to select the correct status to *Smart* where extra messages appear if the program feels unhappy about something. These messages can be suggestions and offer more information if you want it. I wish more programs offered this.

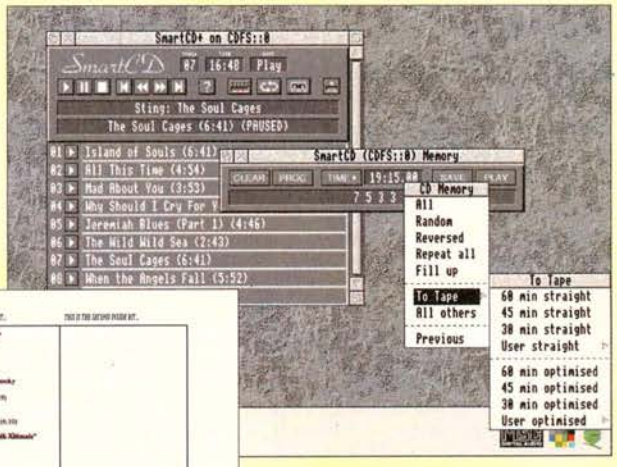
You can add times to your track list and save a textfile of all known CDs – including a preferred play list – in Edit via the tools submenu. Programming a play list is very simple, don't let the word 'program' put you off. The manual is very informative and makes no assumptions which is good news for all users. When you have listed the tracks you want, you have to reverse this, fill up the list with the unused list and so on. There is even a random option if you just can't make up your mind.

Looping is a little more complicated as you need to enter the values of the track you want, for instance: 33:36:12 to 33:39:30. These values are in what is known as Red Book format – minutes, seconds and frames – which is the native CD time format.

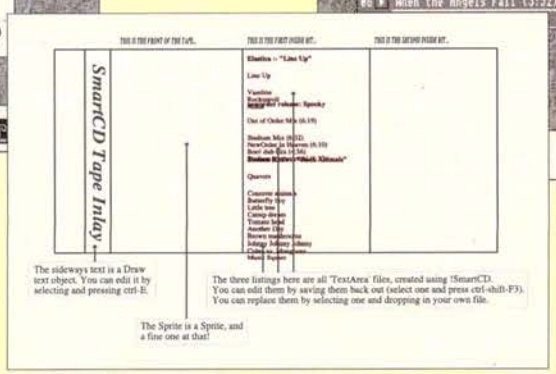
A very nice, comprehensive package which is enjoyable to use as well as useful.



● *Audio CD information at the click of a mouse*



● *Create your very own playlists*


SmartCD Tape Inlay
The sideways text is a Draw text object. You can edit it by selecting and pressing ctrl-E.
The three listings here are all 'TextArea' files, created using !SmartCD. You can edit them by saving them back out (select one and press ctrl-shift-F3). You can replace them by selecting one and dropping in your own file.
The Sprite is a Sprite, and a fine one at that!

● *Design your own tape inlays*

Type Tutor: Learning the home keys

LEARNING to type properly becomes harder the more you get used to typing with two fingers. You can input quite quickly with practice, and learning all about *home keys* takes your typing speeds right down. However, persevere and you will find your speed and accuracy improve.

PRODUCT SPOTLIGHT

Price: £10 (inc VAT)
Supplier: ARM Club, FREEPOST ND6573, London N12 0BR.
Tel: 0171 624 9918
Requirements: RISC OS 3

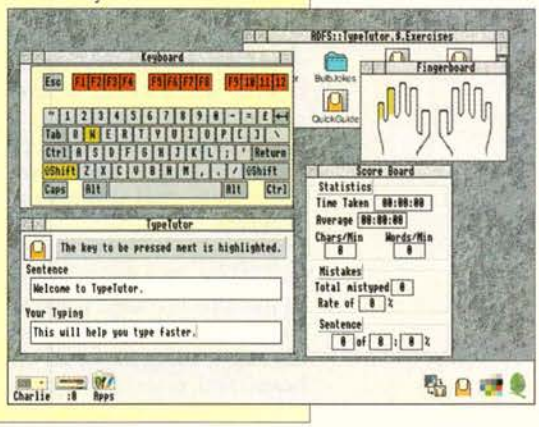
Type Tutor is not a replacement for a proper typing course which includes a lot more than just speed and correct keyboard positioning. However, for a lot of people, the ability to type *properly* with speed and accuracy is all they want. So does Type Tutor give you this?

Primarily this is a set of exercises to teach you the correct fingers to use when typing. A nice touch is the inclusion of the keyboard diagrams in draw file format. The *Archie* file provides the standard Archimedes keyboard layout and a Risc PC figure, and you'll need the Trinity family of fonts and a fair sized font cache to load and print these. For each format there is a blank keyboard and a shaded one showing which fingers to use – useful for putting on a nearby wall for reference.

The program consists of four windows: Keyboard, Fingers, Score and Main. As you'd expect, *Keyboard* puts your keyboard on screen. During the first few exercises all the relevant keys are highlighted. When you progress to sentences, the next key to be pressed is highlighted. If you choose to have the *Fingers* window displayed, the relevant finger is also coloured.

The main window provides the text you need to copy, and underneath, your attempt. Finally, the score gives an ongoing report on your mistakes, speed and so on. The exercises have been structured starting with the *home keys*, and moving through letter combinations and to numbers.

An interesting feature is the *Demo function*. When you click either Select or Adjust over a key on the screen keyboard, you will colour the key and the relevant finger. Where this program does fall down is if you want a program just for practising your speeds. The program simply does not respond quickly enough, and you have to wait for the letters on screen to catch up. But, as the manual says, *you are becoming good enough not to need a Typing Tutor.*



● *Teach yourself speed and accuracy*

Font designer's toolkit: Going it alone

THE first question you might ask is why? With all the hundreds of fonts available commercially, via PD libraries and the Internet, why would you need to make your own fonts? The answer is that this is not an activity to be undertaken everyday.

However, there are times when you would want, or need, to design or modify fonts for particular applications or DTP designs. iSV are a reasonably new company who specialise in fonts, font editing and publishing services, and their toolkit is now in version 2.5.

PRODUCT SPOTLIGHT

Price: £30
Supplier: iSV Products, 86 Turnberry, Home Farm, Bracknell, Berkshire RG12 8ZH.
Tel: 01344 55769

The toolkit is in reality a set of programs: Font Catalogue, FontKern, FontTrix and an ISVMetric editor. There is also the latest copy of Acorn's FontEd application.

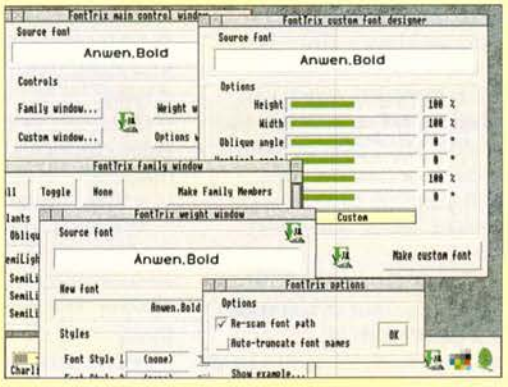
Font Catalogue lets you print tables of all the letters in a font as well as printing pages of fonts by family. A show table and a !Chars table display all the characters with their ascii codes and letters. Bitmap fonts are not shown, rather a space is given. When it comes to the actual printing you can specify some of the settings, but note that postscript printers are not supported and you may run into problems with some fonts and Computer Concepts' Turbodrivers, but the solution is given in the online manual.

FontKern as you'd expect allows you to edit the kerning data. The process is quite straightforward, just load in a font, extract the kerning for application elsewhere, and add an alternative kerning to that font. You can globally kern a font as well as tighten and loosen all the kerning pairs, add your own and so on. You can also convert RISC OS 2 fonts to 3.

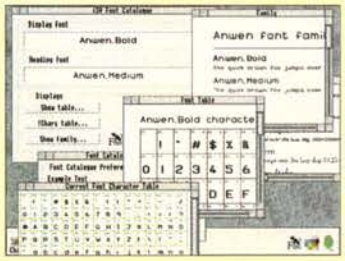
FontTrix allows you to let your imagination and creativity run amok. You can generate a whole family of weighted or slanted fonts from just one basic font on screen. I have reservations about this type of creation, but for one-off display fonts it is an excellent way of creating unusual typefaces.

iSVMetric is the final element to the collection. This gives you the data about the construction of the font and you can load and examine any outline font, examine the information such as how many kern pairs, and also change the character widths as you want. Bounding boxes can also be changed which can be handy if you are running across redraw errors.

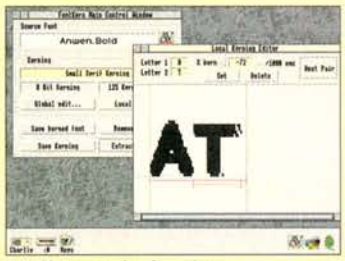
The program is well constructed and uses the RISC OS environment well. If you are serious about your fonts you should take a look.



Designing fonts is a tricky business

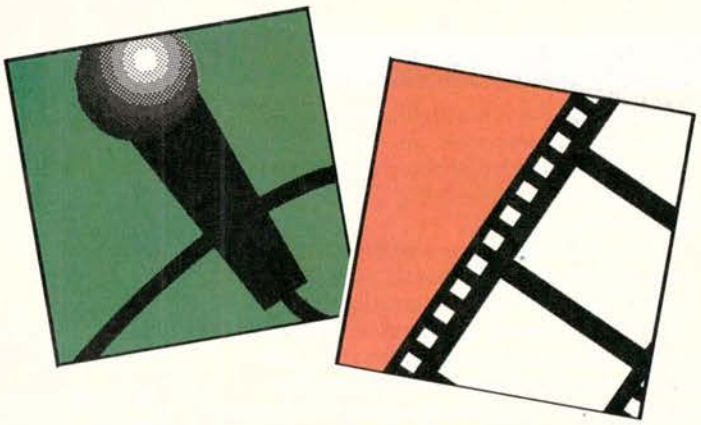


● *All you want to know about your fonts*



● *Change the kerning for the best effect*

● *All you wanted to know, but were afraid to ask*



Sound and vision

Mark Smith examines how the Archimedes range outputs video and audio

THE Archimedes machines have a chip dedicated to the video display and audio output. This chip is called VIDC. Before discussing its capabilities, it is worth explaining some of the technical jargon which surrounds the display that you get on your monitor.

A monitor works in a similar way to a TV set. The inside of the front of the tube is coated with dots of phosphor that emit red, green or blue light when hit by an electron beam. Red, green and blue are three primary colours which, when added together in various proportions, can generate almost any colour in the visible spectrum. An electron beam scans down the monitor from top to bottom one line at a time, with each line being scanned from left to right.

The picture on your monitor is made up of many dots known as pixels – a derivation of *picture elements*. Pixels are displayed as the electron beam scans across each line. The various parameters that control the size and shape of the screen are given in the panel.

There are a number of limitations on the video display. These include the capabilities of the video controller, the range of available pixel rates, bandwidth and the monitor. VIDC1a, as used in the Archimedes, is capable of displaying 2, 4, 16 and 256 colour modes. These require one, two, four and 8 bits respectively to represent each pixel.

In the case of the original Archimedes machines – 300 series, 400 series and A3000 – a 24MHz video clock is provided which can be multiplied by 1/3, 1/2, 2/3 or one to give possible pixel rates of 8MHz, 12MHz, 16MHz or 24MHz. This allows for displays up to VGA standard (640 x 480 at 60Hz field rate).

The data bus is clocked at 8MHz and, being 32 bits (four bytes) wide, allows for a bandwidth of:

```
4x8x10^6x4/5 = 25,600,000 bytes/second
```

The largest video bandwidth requirement will be for the highest pixel rate (24MHz), at the largest colour depth (256 colours = 8 bits per pixel = one byte per pixel). This works out at:

```
24x10^6x1 = 24,000,000 bytes/second
```

Note that there are periods while the border is being displayed and during the flyback of the electron beam at the end of each line and the end of the field, during which time no video data is being transferred. The above figure is a maximum, not the average. The latter can be worked out by multiplying the amount of screen memory being used by the field rate.

So, the available bandwidth is just sufficient, but there is very little remaining for the processor to fetch instructions and read/write data. Therefore the machine will run very slowly with the processor spending a lot of time waiting for video DMA operations to complete, particularly if the machine has an uncached processor – ARM2 or ARM250. Effects such as the screen blanking when the disk drive is accessed can also occur.

Later machines, the Archimedes A540, A5000, A4, A3010, A3020 and A4000, feature a 36MHz video clock in addition to the 24MHz clock. This enables the use of 18MHz and 36MHz pixel rates in addition to the four already listed and allows for displays up to SVGA standard (800 x 600 at 56Hz field rate). A 36MHz video clock can be added to older machines – it is commonly known as a VIDC enhancer.

As well as a faster video clock, these machines also feature faster memory which is accessed at 12MHz. The memory bandwidth is thus:

```
4x12x10^6x4/5 = 38400000 bytes/second
```

The largest possible video bandwidth requirement is:

```
36x10^6x1 = 36000000 bytes/second
```

which should theoretically be possible, but many machines cannot quite manage it, so it is not supported in RISC OS. There are, however, a number of modules around that support mode 32, 800 x 600 in 256 colours. It certainly makes any ARM250 machine run very slowly.

With the exception of older machines with a VIDC enhancer – which will never be able to display 256 colour 36MHz modes – lack of bandwidth does not prevent any modes that can be generated using the standard clock crystal from being displayed on Archimedes.

The final factor that limits that range of possible displays is the monitor itself. The main limitations here are the range of vertical and horizontal sync rates that the monitor can lock on to.

In the simplest case, a monitor that is only capable of displaying TV resolutions can lock on to vertical sync rates between 50Hz and 60Hz, and has a fixed horizontal sync rate of 15.6kHz. Such monitors include Acorn's AKF11, AKF12, AKF30 & AKF40 and can only display modes 0-17, 22, 24 and 33-36.

The other type of monitor in common use on Acorn machines is the multiscan type. This is a blanket type which, as the name suggests, covers monitors which will sync on a range of field and line rates. By and large, these can be categorised into two groups – those that support line rates of 15kHz upwards, generally up to around 40kHz, and those that support line rates of 30kHz upwards, generally up to at least 50kHz.

It is the former group that is usually found attached to Archimedes machines and is

capable of displaying just about any video display that it is capable of generating. Acorn's AKF18, AKF50 and AKF52 monitors all belong to this group. The latter group cannot display the standard TV resolution modes and require either a graphics card (such as CC's ColourCard), or Risc PC to get the benefit of the higher resolutions that such monitors can display. Most multiscan monitors can display field rates between 50Hz and 90Hz, although many can display a wider range of field rates.

In addition, VGA and SVGA monitors can be used as well as high resolution monochrome monitors where the necessary hardware is fitted in the machine – 400 series and 540 only.

Palette lookup

In 2, 4 and 16 colour modes, each pixel is looked up in the palette to obtain the corresponding physical colour. This is then output through three digital-to-analogue converters (DACs), one for each of the primary colours, red, green and blue.

In 256 colour modes things are not quite so simple as, to save silicon area and cost, VIDC1a only has 16 palette registers. In fact, four bits of the physical colour are derived directly from bits in the logical colour while the remaining four bits of the logical colour are used to look up a palette register from which the remaining eight bits of the physical colour are obtained. The result is that the 4,096 colours are grouped into 256 groups of 16 from which any 16 groups may be displayed on screen at any one time.

Audio capabilities

VIDC1a also supports sound output. Audio data is held in memory as eight-bit signed logarithmic values, read by DMA and output through an on-chip digital-to-analogue converter (DAC), and a small amount of additional circuitry.

The conversion rate (sample rate) is configurable in units of 1µs from 3µs upwards. There is, however, an assumption that the VIDC clock being used is 24MHz and sound will be sampled 50 per cent faster with a 36MHz clock.

The sound system supports one, two, four or eight channels. Where more than one channel is selected, sample data starts with one byte for channel zero, followed by each channel in sequence until data has been provided for all channels in use. This is followed by the next byte for channel zero and so on.

Support is included for stereo sound and each channel may take one of seven stereo positions from full left, 83 per cent left, 67 per cent left, centre, 67 per cent right, 83 per cent right or full right.

During sound output, two DMA buffers are maintained. Each is filled with new data by the sound generation software while data is being output from the other.

● *As this is the last issue of Acorn Computing my series will be stopping here for the time being. It should be continuing at a later date in Acorn User.*

Some terms defined

Vertical Sync / Field Rate: The number of times that the electron beam scans the screen every second. The higher this is, the less the screen display will flicker.

Horizontal Sync / Line Rate: The number of complete lines (known as rasters) that are scanned every second.

Pixel Rate: The rate at which pixels are output to the screen.

Colour Palette: A limited number of different *logical* colours may be displayed at any one time. However, these may typically be selected from a much wider range of *physical* (actual) colours. For example, in the case of VIDC1a as used in Archimedes computers, up to 256 different colours may be displayed at once from a total of 4096 different hues that the chip can generate.

Colour Depth, Bits Per Pixel: The colour depth is the number of different colours that each pixel can take without altering the palette settings. This is dependent on the number of bits allocated to representing each pixel with one bit per pixel allowing two different colours to be displayed simultaneously. Eight bits per pixel would allow 256 different colours to be displayed.

Bandwidth: Video data is fetched from memory by DMA operations as described in the last article. The maximum rate at which data can be read from or written to memory (memory bandwidth) is:

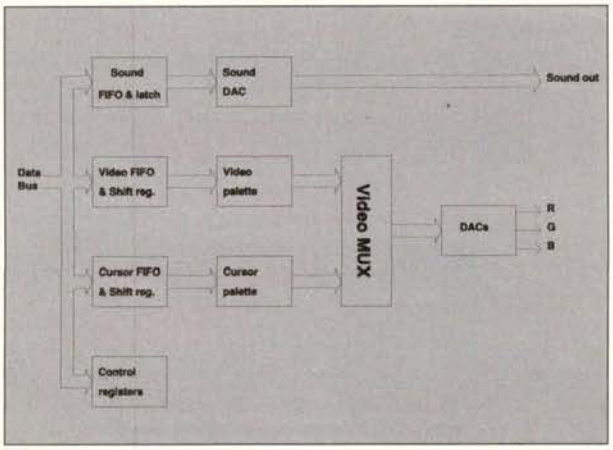
```
4*(memory access clock speed in Hz)
*(4/5) bytes/second
```

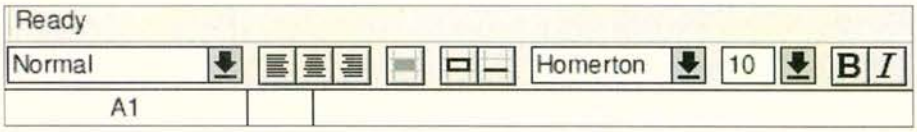
since the data bus is 32 bits (four bytes) wide. The (4/5) multiplier is there because at least one in four memory accesses will be non-sequential (N-cycles) and hence will take twice as long, ie it takes at least five clock periods to read or write four words of memory.

During video DMA operations, the processor must wait for the operation to complete if it needs to access memory. Therefore, the higher the rate at which data is being sent to VIDC for the video display, the more likely the processor will have to wait for any given memory access, and the slower the computer will run. Hence, there is a trade-off between the video display and the computer's operating speed.

The VIDC block diagram

This is a very much simplified figure of a VIDC1a. Sound, video and cursor (mouse pointer) data is read by DMA into the corresponding FIFO (First In, First Out buffer). Sound data is output through a digital to analogue converter (DAC), while the video and cursor data is used to look up the corresponding physical colours. The video multiplexer then overlays the cursor on the video display before outputting the physical display data through the DACs to the monitor, one for each primary colour.





	A	B	C
1	initial loan	£1,000.00	£1,000.00
2	current value	B1+B3	£1,111.11
3	interest	B2*10%	£111.11

Clem Vogler assesses the advantages of version three of Eureka

Zounds — new cognitions

PRODUCT SPOTLIGHT

Product: Eureka 3
Price: £99
Supplier: Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS.
Tel: 01223 425558
Requirements: Risc PC

TWO years ago I reviewed the original version of Eureka and made several criticisms. I've just tried out Eureka version three – for the Risc PC – and Longman have systematically remedied the earlier weaknesses. For instance, a macro facility with programming language has been provided, as has an iterative goal-seeking capacity.

The new printing routine is excellent, with an option to scale the sheet to fit one or more pages, and to centre the sheet either horizontally or vertically – or both. Headers, footers – including page numbering – can be located anywhere. Colour can be printed on a monotone printer as black or grey-scaled.

Row/column headings and grid can be toggled on or off. And best of all, the sheet really does print in the background using RISC OS drivers.

The handbook is much better than the sorry version one affair, and is properly indexed. Handling of non-contiguous ranges – separate blocks – has been improved. As before, you can select any number of cell blocks simultaneously and apply Style features, but now you can graph non-contiguous ranges as well. This gets over the old problem of plotting column A against column C while ignoring column B.

Graph plotting is well implemented overall, with the software making intelligent guesses about the best orientation and chart-type to use – a decision the user can override if necessary. Graphs can be separate or embedded in the sheet. Both graphs and sheets can be exported as graphic images by OLE to suitable target applications like Impression Style or Publisher, with the benefit of updating the recipient when the donor file is exported. Graphic files in Draw or Artworks format can be embedded in sheets, and there are options for exporting data as Lotus or Excel files as well as the usual CSV and SID types.

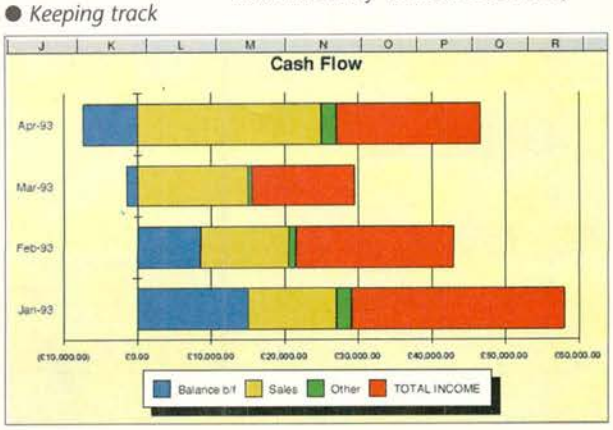
The main thrust of the changes in Eureka 3 are improved data interchange with other applications and enhanced graphics handling. A new graphic-objects sub-menu handles grouping and ungrouping of embedded images and editing of the graphics frames. There is a placement feature which connects a graphic to a group of cells so that it retains its position relative to the group as the sheet size is edited. To compensate for the delay in redrawing large images, there is an option to display them in outline.

A case in point

SUPPOSE a loan of £1,000 attracts interest at 10 per cent of the gross figure of **loan plus interest**. We enter the relevant formulae in a spreadsheet and find that cell B2 refers to B3 and B3 refers to B2. This is called a circular reference, which most spreadsheets assume you entered by mistake. They're usually right, but not this time.

Eureka can calculate the current figure owed by repeated approximations. In column C we show the actual values of the expressions in column B.

● *Keeping track*



Summing up

This latest version of Eureka is more elegant and feature-rich than its predecessor. It is also faster. Although specified for the Risc PC, I tried it briefly on an older machine and I couldn't detect anything that wasn't working. Intrigued, I sought enlightenment from a read_me file supplied called '3'. It was quite empty.

Friendly spreadsheeting

EVEN earlier versions of Eureka were endowed with many features to make them both friendly and powerful. Among these were:

- on/off toggle of grid, row and column labels and zero/empty values for null cells
- easy horizontal and vertical splitting – to hold off-screen rows/columns in view
- cut and paste between sheets in different windows
- active linking of sheets and charts so that changes are updated elsewhere
- choice of relative or absolute referencing
- choice of automatic or manual recalculation
- "fill" command to replicate a cell's contents elsewhere
- mouse-adjustable column widths, with auto-width option
- row height adjustment, so you can avoid text overflow
- option to paste values, formulae or just formats
- wide range of date and time formats
- cell locking
- wide range of built-in functions
- ranges and formulae can be named
- series generator – creates columns of incremented numbers or dates
- array formulae enable you to compute with arrays as you would with single items. This leads to some elegant maths expressions, but is largely redundant in WIMP software, since a couple of mouse drags achieve the same ends.

DTP for the uninitiated

Design without the bells, whistles and price tag. Pam Turnbull investigates

YOU can't help feeling that you should *get into* desktop publishing. Everyone is doing it and it makes letters and invitations look that much better. But where do you start? You can produce some excellent DTP documents using Draw and Paint which come as standard with your RISC OS machine, but this can be tricky, fiddly and more time consuming than using an actual desktop publisher.

Most simple DTP packages are aimed at education, such as Full Phases or First Page, whereas Impression Style will give you a great deal of *professional* facilities without all the effects a professional may want. Then of course there are the word processors which do more than just process words: Wordz, EasiWriter, TechWriter and so on.

Enter TextEase which doesn't promise to be all things to all – which is always a good start – but rather to provide an easy to use desktop publisher for under £30. Too good to be true?

The program comes on one disk, runs from floppy or hard disk and works on a 1Mb machine, though you will need RISC OS 3. Both the program and the manual assume little computer knowledge but manage not to be condescending, and you'll find your hand held by a line of interactive help underneath the button bar.

These buttons – which you can turn off and use the hotkeys and Menu if you prefer – give you access to a range of facilities:

The manual is based around four tutorials and examples. Fonts and ideas are supplied on disk to allow you to play or simply act as a catalyst to fire your imagination.

You can use TextEase as just a word processor adding bold, italic, and underline effects as well as changing the font – CooperBlack and Friendly come with the package courtesy of Skyfall. You can also change the height, size, alignment, and the colour of both text and background. There is a word count for a document or selected area, which is something I've missed on Impression since WordWise, and a spell checker built-in (optional), which either beeps or highlights the word in blue as you prefer. You can add to the dictionary at your will.

Headers and footers can be added: Just select the item you want and choose the repeat rate from the menu. If your header/footer contains a page number – Control+P – this will be updated on following pages, as will the contents if it is moved or changed. Textflow is built in too, along with the facility to add today's date to items – Control+D.

You can set your page to landscape or portrait, and the size from A5 to 9m x 9m. TextEase has a figure option when it comes to printing which lets you paste sheets together via the printed paste markers with a set paper overlap. Very useful for posters and banners.

However, there are more clever things to do with your text, such as framing and shadowing. Boxes and lines can be put around a page or item and similarly shadowed, coloured, thickened and so on.

There is a drawing order built-in which can be altered using hot keys Control+L or Control+H. The reason for this is that each object has an associated *drawing level* which is used to decide which order to draw things. For instance, if text inside a filled rectangle was created first, the rectangle would overwrite the text. So text, by default, has the highest drawing level. However, by switching level you can create interesting effects.

Rectangles can be added by eye or by co-ordinate, and lines can be set to snap to the vertical or horizontal by holding down the Shift key. Draw, sprite and text files can be added and sized as well. Standard shortcuts apply such as Control+A for selecting everything. I would like a grouping option but I understand that this is already on the wish list for the next version.

Summing up

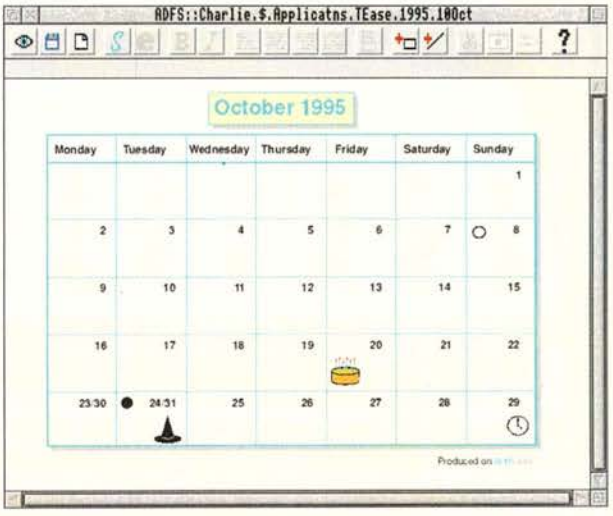
I would recommend TextEase without hesitation to anyone who wants to do DTP work and feels that they haven't either the finances or know-how to deal with the more elaborate packages. Moreover, this product lays down the groundwork and basic design principles you will need if you want to do more complicated DTP projects on other packages at a later date.

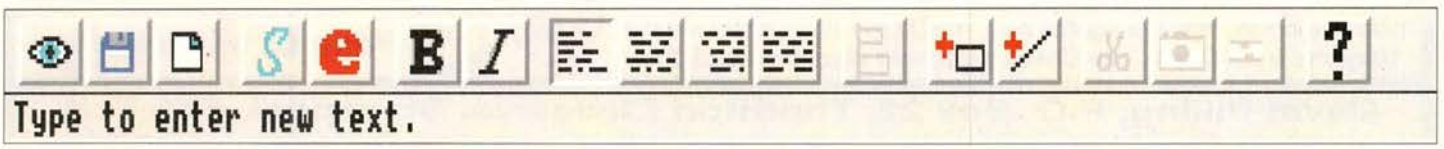
TextEase may be *cheap* but it's certainly not nasty. The software is stable – it's never crashed on us – it's very easy to use, and you can create professional-looking documents in the minimum of time with very little technical know-how.

PRODUCT SPOTLIGHT

Product: TextEase
Price: £29.50 (inc VAT) with spelling checker £39.50
Supplier: SoftEase, The Old Courthouse, St Peters Church Yard, Derby DE1 1NN.
Tel: 01332 204911/01684 73173

● *Create your own calendar for 1995*





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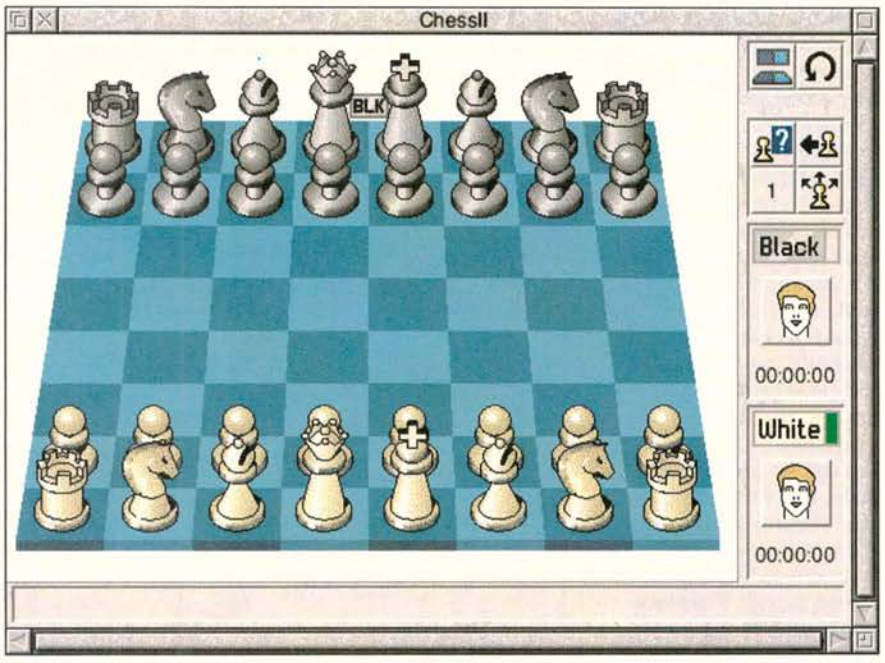
Chess II



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Two character witnesses

Bruce Goatly uses OCR to read between the lines again

BOTH of the OCR applications Sleuth and Optical have been around in earlier incarnations for a while. When I reviewed them a year ago (in the March 1994 issue), I reported that as they were under development, the jury was to some extent still out.

Sleuth came over as a good no-frills package that could be installed and run straight away, whereas Optical needed setting up and training to get the best out of it. Now that new versions are available, how have they changed?

My few criticisms of the earlier version of Sleuth were that it couldn't read italic or bold variants of those typefaces it had been trained on, it couldn't handle accented characters and it came without a spelling checker. Version 2.5 does now recognise bold and italic styles, the range of fonts it can read has been enlarged to cover most of the popular ones, and it can display text with style changes it has detected.

A spelling checker is now integrated into the reading process if you want to use it, which improves the accuracy considerably – 99 per cent or more is claimed. Words that it can't identify are highlighted in yellow, although contextual errors will of course be ignored, as with all spelling checkers.

There have been several other developments as well – you can define zones within a scan that should be read or ignored, and the software can detect multi-column text and try to read it in a logical order. There's also support for Twain to allow you to scan pages directly to the application if you have a suitable scanner and driver, though as I don't have Twain drivers I couldn't check on that.

The new version is definitely a considerable advance over the older ones. Even so, the manual is short, clear and simple, exemplifying the ease of use of the software.

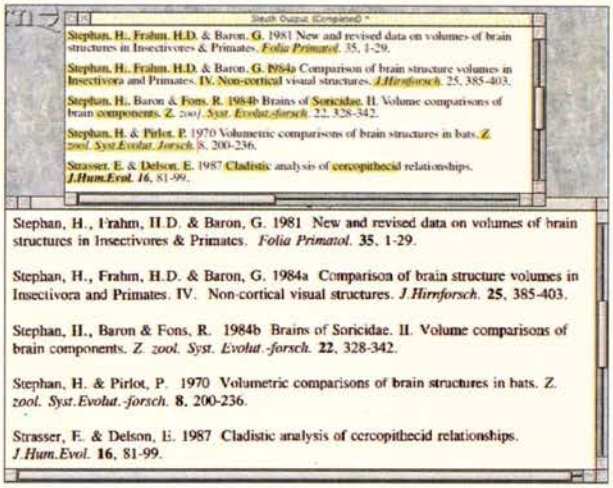
The display doesn't actually attempt to use on screen the fonts recognised by the software – it simply displays them generically, using Trinity for serifed fonts and Homerton for sans serifs.

The Preferences dialogue has been kept as simple as possible, defining only necessities such as what characters to use at line and paragraph ends, what resolution the scan was made at, what degree of word checking to use, and a speed/accuracy control. This makes it ideal for users with a wide range of expertise.

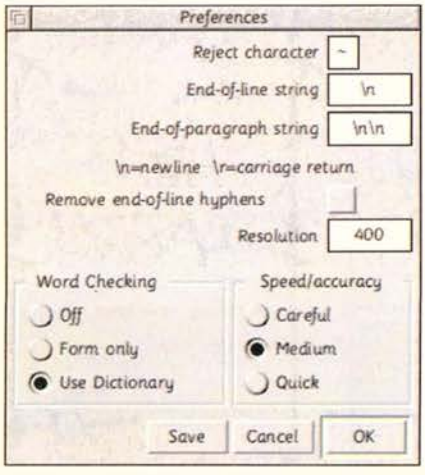
Because Sleuth is multi-tasking you can edit converted paragraphs while the OCR process continues. To help with this, a word display window shows you the word at the ➤

PRODUCT SPOTLIGHT

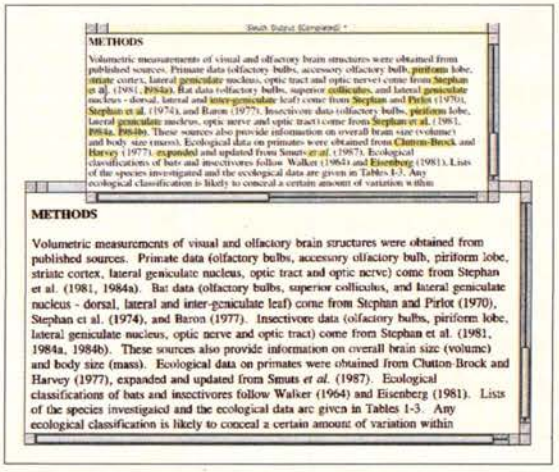
Product: Sleuth 2
Price: £99 plus VAT (upgrade from Sleuth 1.5: £49)
Supplier: Beebug, 117 Hatfield Road, St Albans, Herts AL1 4JS.
Tel: 01727 840303
Requirements: RISC OS 3.1, 4Mb ram, hard disk and scanner capable of 300 dpi or better


Stephan, H., Frahm, H.D. & Baron, G. 1981 New and revised data on volumes of brain structures in Insectivores & Primates. Folia Primatol. 35, 1-29.
Stephan, H., Frahm, H.D. & Baron, G. 1984a Comparison of brain structure volumes in Insectivora and Primates. IV. Non-cortical visual structures. J.Hirnforsch. 25, 385-403.
Stephan, H., Baron & Fons, R. 1984b Brains of Soricidae. II. Volume comparisons of brain components. Z. zool. Syst. Evolut.-forsch. 22, 328-342.
Stephan, H. & Pirlot, P. 1970 Volumetric comparisons of brain structures in bats. Z. zool. Syst.Evolut. forsch. 8, 200-236.
Strasser, E. & Delson, E. 1987 Cladistic analysis of cercopithecid relationships. J.Hum.Evol. 16, 81-99.

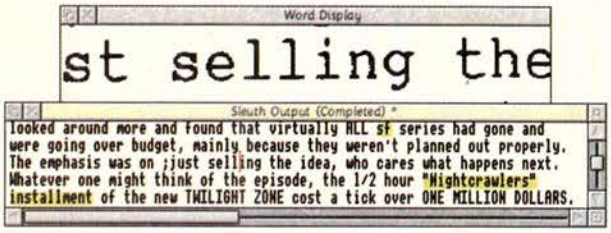
● *Sleuth picking up font changes, though bold is difficult*



● *Sleuth's uncomplicated Preferences dialogue*


METHODS
METHODS
Volumetric measurements of visual and olfactory brain structures were obtained from published sources. Primate data (olfactory bulbs, accessory olfactory bulb, piriform lobe, striate cortex, lateral geniculate nucleus, optic tract and optic nerve) come from Stephan et al. (1981, 1984a). Bat data (olfactory bulbs, superior colliculus, and lateral geniculate nucleus - dorsal, lateral and inter-geniculate leaf) come from Stephan and Pirlot (1970), Stephan et al. (1974), and Baron (1977). Insectivore data (olfactory bulbs, piriform lobe, lateral geniculate nucleus, optic nerve and optic tract) come from Stephan et al. (1981, 1984a, 1984b). These sources also provide information on overall brain size (volume) and body size (mass). Ecological data on primates were obtained from Clutton-Brock and Harvey (1977), expanded and updated from Smuts et al. (1987). Ecological classifications of bats and insectivores follow Walker (1964) and Eisenberg (1981). Lists of the species investigated and the ecological data are given in Tables 1-3. Any ecological classification is likely to conceal a certain amount of variation within

● *Suspect words highlighted by Sleuth*


Word Display
st selling the
Sleuth Output (Completed) *
looked around more and found that virtually ALL st series had gone and
were going over budget, mainly because they weren't planned out properly.
The emphasis was on ;just selling the idea, who cares what happens next.
Whatever one might think of the episode, the 1/2 hour "Nightcrawlers"
installment of the new TWILIGHT ZONE cost a tick over ONE MILLION DOLLARS.

● *The word display window in action*

➤

caret in the original sprite.

The slight drawback with this is that if a word is exceptionally long, or several words have been joined together, it is no longer possible to read the complete original in the word display window. Perhaps the display could move to keep the position of the cursor in view?

Once the conversion is complete you can export the result as plain text or in Rich Text Format, which retains the style information garnered by Sleuth and can be read by some word processors and DTP packages.

There's not much more to say, really. That's by no means a criticism – it works, and very competently too.

The only real negative is that Sleuth can have trouble on a Risc PC if you are running other multi-tasking applications at the same time – it seems to go into hibernation while looking for text lines. This is very unfortunate, and the fact that it's apparently the other applications' fault is no consolation when you have to shut them all down, even – in my case – the scanner driver. Beebug says that Acorn is looking into it.

In comparison, Optical is a much more ambitious project. Where Sleuth aspires to overall simplicity, Optical's aim is to allow the user as much control as he or she may want over the software. As a result it comes with what is at first sight a bewildering array of options, which have nevertheless been slightly simplified from earlier versions.

For instance, you can take on the work of finding the text areas on the page, or leave it to the software. A sliding scale governs speed versus accuracy, replacing the *ligature splitter* control and others.

The *type teach* facility is much easier to use and is more flexible, allowing you to split letters that have been read as joined, or join parts of a letter that have been split. You can even manually define the degree of overlap of adjacent letters.

As before, you can train the software yourself on any Acorn-format outline fonts on your machine, thus giving the type teaching process a head start. In addition, there are attractive and sophisticated features such as the ability to read tables as tables and output as comma-separated value (CSV) files ready for use by a spreadsheet or other suitable software. The colour mapper overcomes the problem of text overprinted on a colour background by letting you define colours in a greyscale scan as either background to be ignored or text to be read.

I couldn't resist the *Menu-linked embedding* option, which is really pretty advanced. This is linked to the direct scanning facility, which drives your scanner without the need to load up the scanner's own software.

In essence, MLE lets you specify one or more text editors that will act as the focus for commands to scan a page, initiating scanning and receiving the converted text. It operates via an extra item at the bottom of the menu of the text editor you've chosen and works very effectively.

Clicking on the added option *OCR text* starts up the scanner and loads the scanned sprite into Optical. After the text has been read it is deposited straight into the window you started from – ideal for long documents.

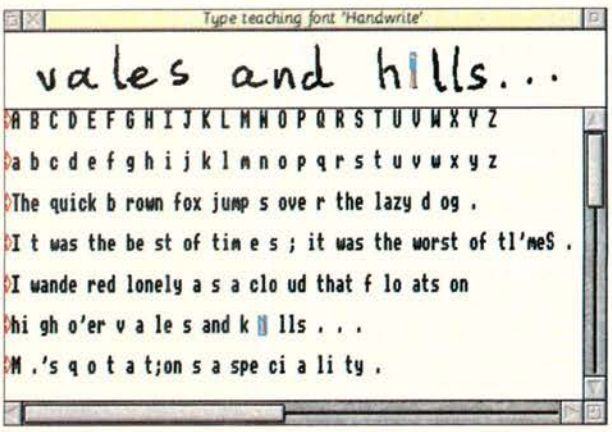
There is also an error-guessing option for Optical to indicate its confidence – or lack of it – in the reading process by changing the grey level of letters. Those it is less sure of are shown darker, so even without the spelling checker you have a good chance of picking up mistakes.

Interestingly, Optical even made a fair stab at recognising handwritten text once I had trained it on a couple of alphabets. It only managed non-joined-up writing of course. Move over Newton – Acorn is right behind you!

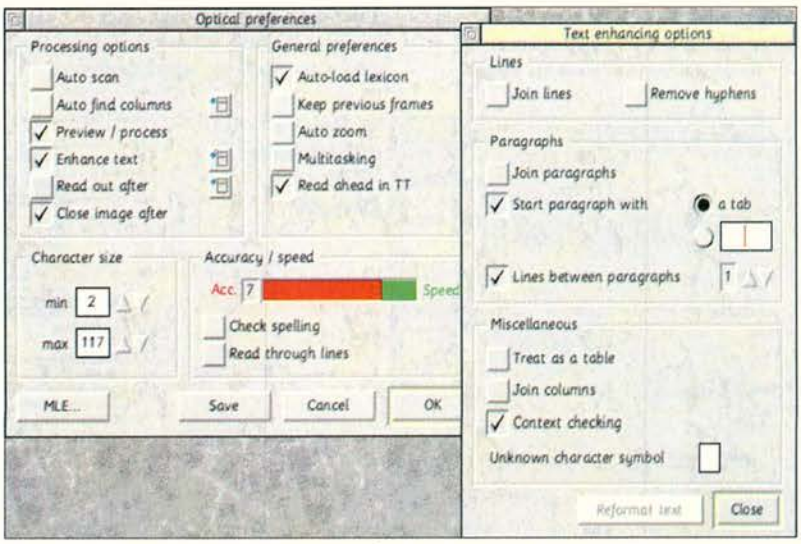
In addition to plain text, there is an option to save in Impression's

PRODUCT SPOTLIGHT

Product: Optical 3.5
Price: £50 (standard), £149 (professional)
Supplier: Neurotron Software, 11 Craighall Avenue, Levenshulme, Manchester M19 2BR.
Tel: 0161 225 4569
Requirements: RISC OS 2 or 3, 4Mb ram, scanner capable of 300 dpi or better


Type teaching font 'Handwrite'
vales and hills...
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
The quick b rown fox jump s ove r the lazy d og .
I t was the be st of tim e s ; it was the worst of tl'meS .
I wande red lonely a s a clo ud that f lo ats on
hi gh o'er v a le s and k lls . . .
M .'s q o t a t;on s a spe ci a li ty .

● *Optical having a go at my handwriting – who's training whom?*



● *Optical's at-first-glance formidable Preferences dialogue*

DDF format, and RTF output is promised by the date of release. You can also have the OCR'd text spoken back at you automatically if you have a compatible speech synthesiser – notably ARCticulate, Speech! or SpeechSystem

The manual has been much improved over the first version, and although the one I was using had already been superseded by new developments, it was easy to follow how the extra bits worked. A whole new manual is in preparation – what would be nice would be a section on training on new fonts.

The main differences between Optical and Optical Professional are that the standard version comes without the spelling checker, the colour mapper, menu-linked

Menu-linked embedding from Optical to Impression Publisher

embedding, automatic column detection, style detection and table detection, amongst other features. It can still do a fair job of course, but less conveniently and less accurately.

I should add that the version I had for review was not completely finished. The main areas still under development were speeding up and polishing the intelligent spelling checker, giving support for Twain drivers, adding more font definitions and providing text saving in RTF format.

You should also be able to specify frames to be ignored – useful for graphics and the like – but for now this can be achieved with the colour mapper.

Head to head

Both packages put in a respectable turn of speed – Optical with the spelling checker turned off – and could recognize font changes to italic or bold fairly well. Both can display the text in their styles on screen.

Both had some difficulty in getting spacing between letters right – words were occasionally broken or joined together wrongly.

The difference in philosophy between the two programs is exemplified by the way in which text is output in the software's own window. Sleuth effectively says, "Here's what I've made of it, now you do your bit," whereas Optical keeps hold of the reins and won't allow you to edit the read text directly – but it does give you the option of automatic text transfer into your favourite word processor or DTP package, which is a big potential advantage if you have long documents to scan.

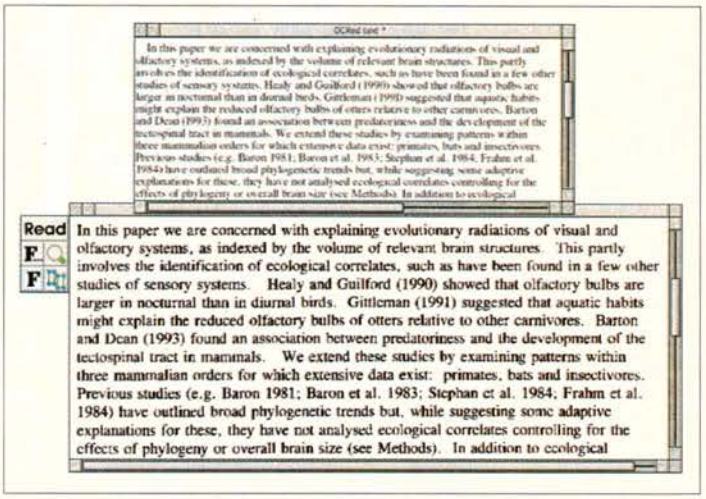
Sleuth is multi-tasking while doing its thing, whereas Optical lets you choose between multi-tasking and mono-tasking during conversion.

Unsurprisingly, both packages had problems with awkward fonts like Avant Garde, whose letter shapes even humans find hard to differentiate. Corpus also gave particular difficulties over detecting the spaces between letters or words and distinguishing between the letter 'l' and number one.

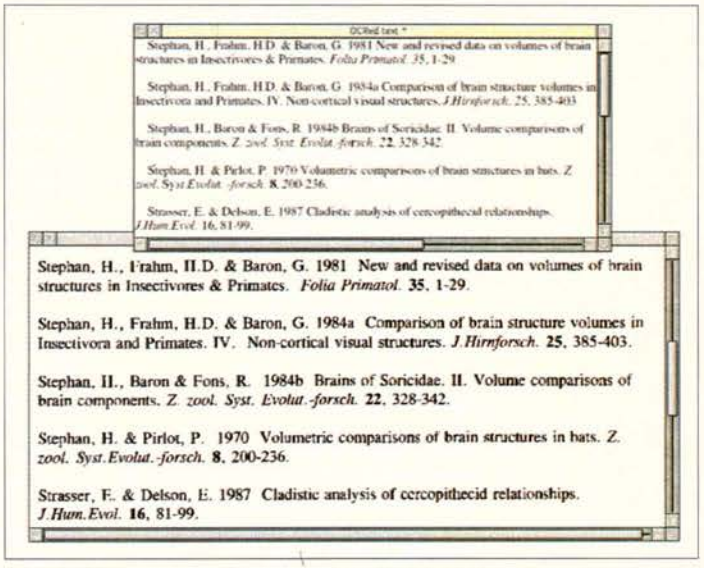
Optical's table-reading and CSV outputting facilities are clever but blank cells were ignored – I understand that this will be fixed. Sleuth, on the other hand, read the table one column after another so it came out as a one-column list.

As ever, the bottom line is accuracy and, to some extent, speed. The version of Optical I had used a very slow spelling checker, so a speed comparison is difficult.

Equally, with incomplete spell checking facilities, Optical was unable to deliver quite as high an accuracy as Sleuth because it was relying solely on letter, not word, recognition. But against that must be set Sleuth's hibernation problem on the Risc PC, and Optical's convenient ability to read text direct into other text-processing software.


Read
F
F
In this paper we are concerned with explaining evolutionary radiations of visual and olfactory systems, as indexed by the volume of relevant brain structures. This partly involves the identification of ecological correlates, such as have been found in a few other studies of sensory systems. Healy and Guilford (1990) showed that olfactory bulbs are larger in nocturnal than in diurnal birds. Gittleman (1991) suggested that aquatic habits might explain the reduced olfactory bulbs of otters relative to other carnivores. Barton and Dean (1993) found an association between predatoriness and the development of the tectospinal tract in mammals. We extend these studies by examining patterns within three mammalian orders for which extensive data exist: primates, bats and insectivores. Previous studies (e.g. Baron 1981; Baron et al. 1983; Stephan et al. 1984; Frahm et al. 1984) have outlined broad phylogenetic trends but, while suggesting some adaptive explanations for these, they have not analysed ecological correlates controlling for the effects of phylogeny or overall brain size (see Methods). In addition to ecological

● *Straight text as read by Optical*


Stephan, H., Frahm, H.D. & Baron, G. 1981 New and revised data on volumes of brain structures in Insectivores & Primates. Folia Primatol. 35, 1-29.
Stephan, H., Frahm, H.D. & Baron, G. 1984a Comparison of brain structure volumes in Insectivora and Primates. IV. Non-cortical visual structures. J.Hirnforsch. 25, 385-403.
Stephan, H., Baron & Fons, R. 1984b Brains of Soricidae. II. Volume comparisons of brain components. Z. zool. Syst. Evolut.-forsch. 22, 328-342.
Stephan, H. & Pirlot, P. 1970 Volumetric comparisons of brain structures in bats. Z. zool. Syst.Evolut.-forsch. 8, 200-236.
Strasser, E. & Delson, E. 1987 Cladistic analysis of cercopithecid relationships. J.Hum.Evol. 16, 81-99.

● *How Optical fared with font changes – bold is still hard*

Summing up

Strangely, even though both of these packages have developed enormously in the past year, I feel that what I wrote about them originally still holds largely true.

As before, Sleuth comes out ahead of Optical Professional in *plug-and-play*ness, as it has fewer controls and consequently less to confuse the novice or take up the professional's time. On the other hand, Optical has more options and the greater potential for development by the user.

Sleuth is excellent for many purposes and continues to achieve its aim with a minimum of fuss. Optical Professional should, once the final bits have been added, prove ideal for high-volume and technical work, and its standard incarnation should serve as a useful introductory package.

A brief history of lime

Michael Rozdoba presents the sour truth

REPUTED to be the small round green fruit of *Citrus aurantifolia*, I have recently discovered that in fact this substance is a slimy calcium-based caustic material.

Under no circumstances should you believe the lies disseminated by certain organisations, who suggest it can be freely mixed with refreshing beverages such as lager. This is part of an alien conspiracy to poison the world's native population. We must not submit...

Incidentally, this issue may see the last TechForum and, indeed, may be the last *Acorn Computing*. Would both my readers please direct their letters of surprise, complaint or congratulations direct to the publishers.

Disclaimer: the above statement bears no relation to the title and intro to this month's column.

Assembler rooting

MRA Barnett is back again with yet more clever ARM code, this time to divide two variable 16-bit numbers and to square root any 32-bit number. MRA's code and explanations can be found on the MegaDisk in directory *Barnett*.

The square root routine is fairly standard, though much easier to follow than most. It's also intrinsically about five per cent faster than the versions I have previously come across. However, it is harder to generalise to numbers greater than 32-bit, because it needs to maintain the value of the current root guess squared.

Usually that's no problem, since to root a 32-bit integer, the intermediate guesses are 16-bit at most and so their squares are 32-bit. Nevertheless, there are cases where you need intermediate values wider than 32-bits.

For example, to square root a 32-bit fixed point number where the low 16-bits represent a fractional component, you actually need to extend the argument to 48-bit with a 32-bit fractional part, in order to end up with a result after rooting that still has 16 fractional bits.

Consider using such a method to calculate root two. Two is represented by 2*65536, which yields as its root the integer part of square_root(2*65536*65536), that being the 16-bit fixed point number 92681.

This gives the computed value of the root as 92681/65536 = 1.414200, which compares favourably with the actual root of roughly 1.414214.

In this situation the more familiar root algorithm needs to be used, as it does generalise easily to wider arguments.

In case this routine isn't so familiar to you, you'll find my version of the root procedure for fractional numbers also on the MegaDisk, in directory *FracRoot*.

And dividing!

MRA's division function is of rather more limited use than the square root one because of the restriction

24-bit sprites

With the advent of the Risc PC, 24 bpp images are going to become much more prevalent across the Acorn platform, as the latest crop of scanners, digitisers, CD-Roms and photo retouching packages begin to suggest.

Despite this, many users are still stuck with the old Acorn hardware, and need some means to convert the new images into a form viewable on their machines.

Any such method must involve dithering and there are two main techniques available. One employs a local clustered dot dither, which has the advantage that isolated parts of an image can be dithered independently, while the other method uses the well-known error-diffused dithering, such as Floyd-Steinberg.

From the user's point of view, graphics loaders can solve a lot of the practical problems, performing format conversions incorporating dithering transparently. However, until these are a standard part of RISC OS, rather than commercial third party products only, individual programmers wishing to provide general-platform access to deep colour sprites within their programs, are still going to have to code their own implementations of some dithering process.

Two months ago I described a method to downsize sprites for the creation of thumbnail images, which involved error diffusion.

This method can be enhanced, allowing dithering of 24 bpp sprites using the standard 256 colours, to produce results almost as good as ChangeFSI. If this process is recoded in assembler, it can easily outperform ChangeFSI in speed by 500 per cent! This makes it well suited to allowing 24 bpp images to be dithered and viewed on Acorn machines fitted with the old VIDC.

I *was* going to describe this process in a future TechForum. Alas, as I explained at the outset of this month's column, that will probably no longer be possible.

If you would like to see such a feature, why not drop a line to the publishers?

on the range of arguments to 16-bit. However, when applicable, it is certainly the fastest implementation I've ever come across and is possibly optimal for the ARM.

It manages division at just over two cycles per bit by making very ingenious use of multiple variable storage within a single register. This makes it about 250 per cent as efficient as the usual implementation. Beat that if you can.

The cunning method utilised certainly warrants further explanation.

If you've ever written a division routine, you'll know it requires a loop executed *n* times to divide two *n*-bit numbers, iterating a process something like:

```
dividend = dividend * 2
remainder = remainder * 2 + carry
if (remainder >= divisor) {
 dividend += 1
 remainder -= divisor
}
```

This starts with the supplied *dividend* and *divisor*, and with *remainder* initialised to zero. It ends with the correct *remainder*, and with the quotient in *dividend*. Each pass through the loop can be achieved using five instructions and only five cycles, say with:

```
MOVS   dividend, dividend, LSL #1
ADC    remainder, remainder, remainder
CMP    remainder, divisor
ADDHS  dividend, dividend, #1
SUBHS  remainder, remainder, divisor
```

However, when arguments are restricted to 16-bits, if we put the *dividend* into the low 16-bits of register *dnd* and use its high 16-bits to store the *remainder*, by setting register *dsr* to *(divisor<<16) – 1*, the looped code can be achieved using only two instructions, thus:

```
RSBS      dnd, dsr, dnd, LSL #1
ADDLO     dnd, dnd, dsr
```

The first instruction both shifts dividend and remainder, at the same time as testing new remainder against divisor and making the changes to both, on the assumption that remainder is greater than or equal to divisor. The second instruction deals with the cases where this is incorrect, by reversing the changes just made.

When the loop terminates, *dnd* contains the quotient in its low half and the remainder in its upper half. You should notice that the comparison *dnd* >= *dsr* is equivalent to *dividend* >= *divisor* only because the comparison is >=.

For this case, shifting *dividend* and *divisor* up 16-bits, and then adding an arbitrary low 16-bits into *dnd* – the *remainder* – makes no difference.

However, if the comparison had needed to be >, this method would fall apart, as *dnd* > *dsr* is not equivalent to *dividend* > *divisor*. This is because it would be possible to have *dividend* <= *divisor* – in fact, equal – but then have *dnd* > *dsr*, due to the added low bits in *dnd*.

Bend your mind around that lot, if you can.

Escaping from the WIMP

Although not generally recommended, there are circumstances when you might need to use the Escape key to interrupt your wimp application in much the same way as Escape was used to stop old single-tasking Beeb programs – for example, to halt an occasionally-used computation intensive single-tasking procedure.

In such a situation it may be more convenient to explicitly re-enable the Escape mechanism, rather than directly scan Escape as for any other key.

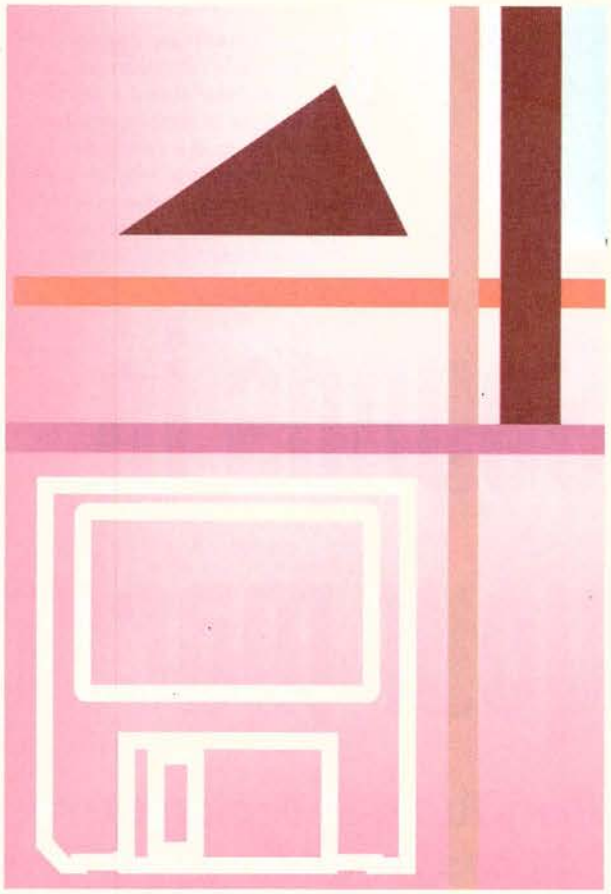
If you need to do this you must make sure it is always disabled again before you next call *Wimp_Poll*, to avoid affecting the behaviour of other applications. However, as long as you comply with that requirement, all else should be well.

Escape can be enabled with *OS_Byte 229*, by passing r1=r2=0, and disabled with arguments r1=255, r2=0.

I tried this in a C application a while ago, and it didn't seem to work. It took me, dolt that I am, two months to figure out that it had in fact enabled Escape, but this was still being ignored by my application, as Acorn's RISC_OSLib *wimpt_init* function registers its own handlers for all *signals* within the C environment, including Escapes.

In the specific case of Escape, the wimpt handler does nothing, other than re-register itself, presumably as a safeguard to ensure Escapes are ignored should another application incorrectly enable them across a *Wimp_Poll* call.

So if you're writing in C and use Acorn's *wimpt_init*, to receive Escapes you will need to both enable them, via the *OS_Byte* call, and register a suitable signal handler using *signal(SIGINT, handler)*, where *handler* has prototype *void handler(int sig)*.



Use *SIG_DFL* as the handler if you just want to reset it to the default used prior to calling *wimpt_init* – the one which produces the *interrupt received from user – program terminated* message followed by program termination, whenever Escape is pressed.

Splitting the argument

Suppose you want to add the constant &8012 to r0 within a segment of assembler code?

Easy. As this is not a valid immediate constant, you would use two instructions to perform the addition, spreading the constant between them. For instance:

```
ADD       r0, r0, &12
ADD       r0, r0, &8000
```

However, what if you wanted to do a comparison between a register and a similar constant?

If you're new to writing ARM code, it may not have occurred to you that an analogous method can be used. By way of an example, to compare r0 with &8012, testing for equality, you could simply do:

```
EOR       temp, r0, &12
EORS      temp, temp, &8000
```

with the last instruction setting Z if and only if r0=&8012.

Sounds in your machine

Pam Turnbull explores three options for adding your own sounds to any Acorn machine

OF course everyone knows what a sound is – vibrations of the air – but how about a *sample*? The principle is simple: We hear by vibration and a computer is able to access these vibrations via a microphone as voltages which can be measured and recorded.

These voltage vibrations are analogue and a sound sampler converts these to a digital format which a computer can understand and manipulate. A single sample of the digital information is taken at regular intervals and stored in the computer's memory.

This sampling technique results in an approximation of the original sound, and errors are introduced. By decreasing the time delay between samples, the error is reduced. However, this requires more memory. So, all sound sampling is a play-off between quality and memory.

As a benchmark, CDs are recorded using over 44 thousand samples per second (44.1kHz). The human ear is only sensitive to frequencies between 10 and 20kHz, with an average of 15kHz. In an ideal world sampling is done at more than twice the highest frequency we can hear, so that they are not missed.

Acorn machines use an 8-bit logarithmic format which has a bigger dynamic range than a linear sample. This means that you have better definition in the quieter areas of the sample. However, the same machines by default playback at 20kHz, so remember this before you start sampling at a very high frequency.

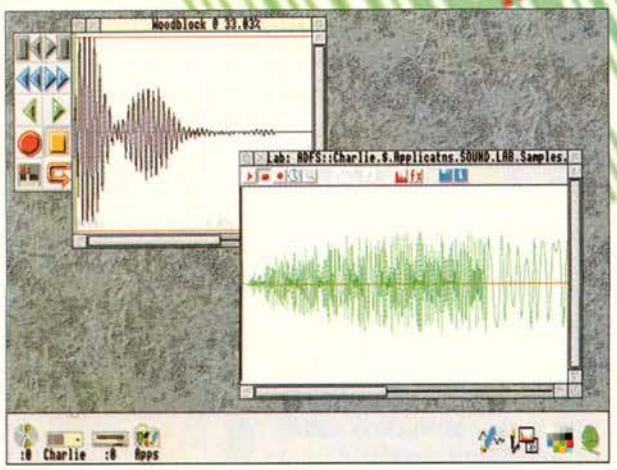
Printer Port Sampler

The complete package consists of an interface which, unsurprisingly, plugs into your printer port and allows you to attach either a microphone, line or both. This means that you can record directly from a CD, TV, DAT player, radio receiver and so on. The overall principle of using the printer port is ideal for computers with minimal expansion slots. A microphone comes with the package which means you can start sampling straight away with individual voices or more complex sounds.

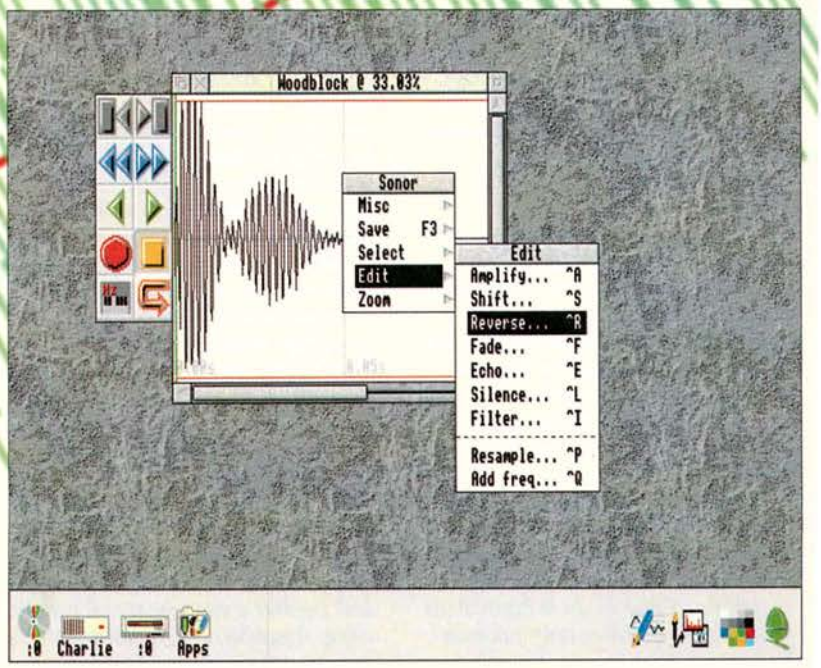
What you do with these samples is then down to the software. VTi bundle Sonor with their sampler allowing you to rearrange sentences or isolate individual instruments from a piece of music. However, Sonor provides facilities which more advanced *samplers* will be able to explore and learn from. Sonor provides a maximum sampling rate of 35kHz.

The controls are very straightforward, mimicking those of a tape recorder: Play, stop, pause, rewind, fast forward and record. Once a sound has been captured – a host of sounds have been saved for you in the package so you can get to work straightaway – it is displayed in the main window. The best way to get to grips with a package like this is to experiment and there is plenty to do. From filters and fades, to wipes, reverses and amplification, you can cut and paste and save in various formats. In particular, Armadeus, Tracker, Audioworks, IBM PC, Wav 16 and 8-bit.

Sonor is the same software that VTi provide with their Midi sampler – reviewed in the January '95 issue of *Acorn Computing*. The software allows you to scroll through your sample and cut and paste as you



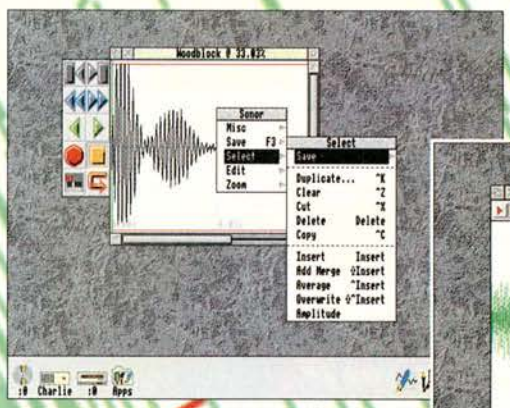
● *Sonor has chunkier control, but SoundLab's icons are more button bar-like, needing less use of the Menu button*



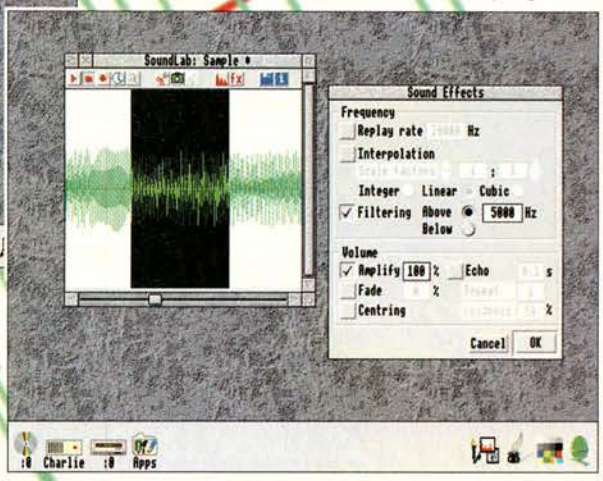
● *Sonor's effects are accessed via Menu or keyboard shortcuts*

would in a word processor. The add frequency facility lets you add a sine wave to part of the sample and you can apply filters to remove certain frequencies which leads to a very versatile and flexible system.

An oscilloscope is included so you can see your sound and is useful for checking levels. I particularly like the undo/redo option, though I wish it had unlimited undo as in ArtWorks. But then you can't have everything.



● *Bring word processing skills to your sampling*



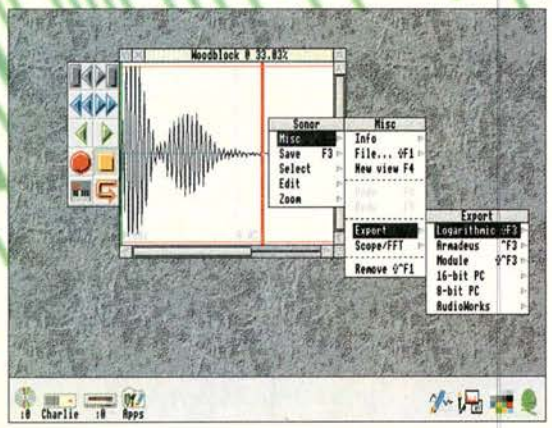
Talking Canvas Junior

Also in the box is this education package which is fun to play with and which is being developed by VTi into enhanced versions for individual release later this year. Talking Canvas Junior is a simple introduction to multimedia which allows you to create single page – or canvas – of pictures with the minimum of fuss.

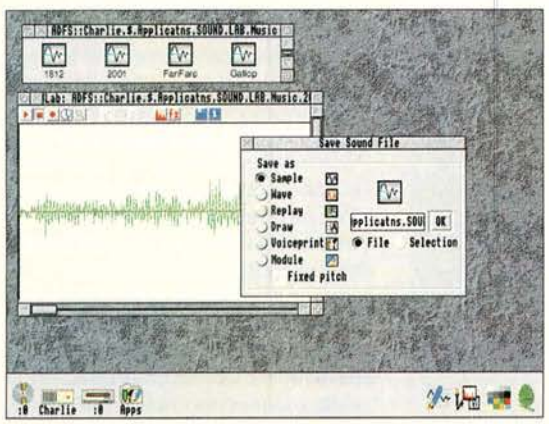
For instance, you can create a sheet of draw and sprite files of farm animals and add animal noises so that when someone clicks on a picture, a sound is heard. Alternatively you could create a picture of your family and get everyone to say their name. Just speak into the microphone attached via the Printer Port Sampler and record straight into the canvas. You can bypass Sonor completely, but if you need to tidy up a sample you can load the sample into Sonor for enhancing.

Talking Canvas Junior is a limited application – well it is free – so you are limited to single pages. But files can be saved in a copyright-free format. The only limits on your creativity being the size of your computer's memory.

In total each canvas can have two frames of animation, but unlimited draw and sprite files. You can link pictures and sound simply by dragging. Animation is straightforward too – just drop two pictures into the window animation box. Multiple linkages are not possible in this version, but you can create some useful worksheets and interesting pictures. A nice addition.



● *Sonor and SoundLab export/save in a variety of ways*



Oak Recorder 3

IN its original form, Oak Recorder was the first package to bring cheap, reliable and easy-to-use sampling to the RISC OS machines. This has been developed over the years and the latest version utilises the bi-directional printer port and is packaged with much improved software – SoundLab.

It too comes with a microphone, and the unit provides one socket and was developed with the sole purpose of putting sound into programs. You can actually replace the microphone with a musical instrument that has the appropriate connector – an electric guitar for instance, which is a good way of bypassing the noise a microphone can generate or pick up. This is not as sophisticated as having Midi input, but for the majority of users it will be all they need.

SoundLab features a particularly useful *trigger* option. This means that you can leave the microphone switched on and recording will only commence when you start talking. This is a little tricky to get right, as you must make sure that there aren't any background noises, and occasionally your computer may ➤

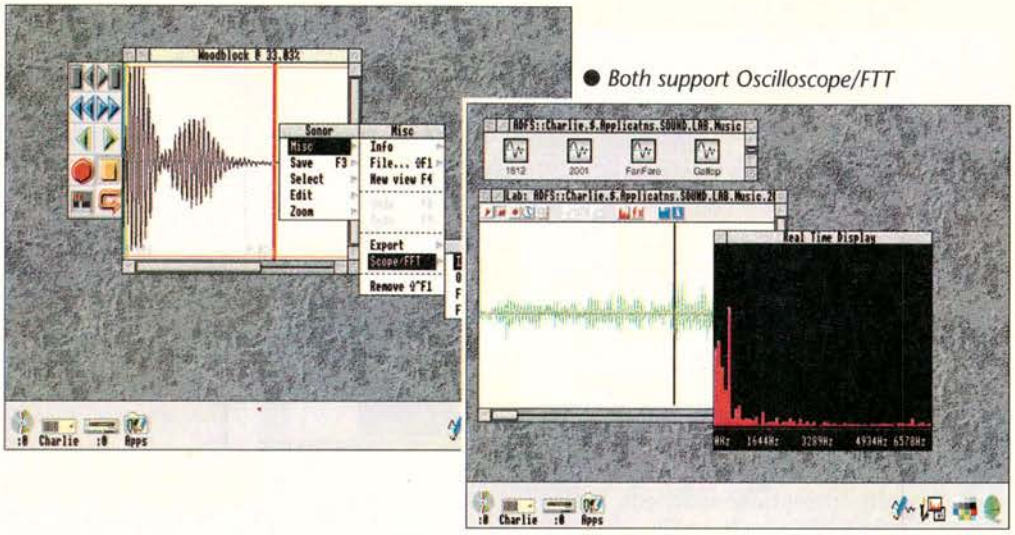
PRODUCT SPOTLIGHT

Product: Printer Port Sampler
Price: £46 (inc)
Supplier: VTI, Unit 1 The Shopwhyke Centre, Shopwhyke Road, Chichester, West Sussex PO20 6GD.
Tel: 01243 531194

Product: Speech 2
Price: £29.95 (£10 to upgrade)
Supplier: Superior Software, PO Box 6, Brigg, South Humberside, DN20 9NH.
Tel: 01652 658585

Product: Oak Recorder 3
Price: £56.34 (inc)
Supplier: Solent Computer Products, 2 Mills Lane, Longstanton, Cambridgeshire CB4 5DG.
Tel: 01954 789701

Requirements: Bi-directional printer port ie A5000, A3010/20, A4/5000 and Risc PC.
Oak Recorder 2 works on older machines, also comes with SoundLab software and costs £50.47 (inc).



● *Both support Oscilloscope/FFT*

➤

miss the beginning of the sample.

Having said this, I did find the option useful, and you can of course use the standard record button in the program and just switch the microphone on. I also like the ability to add one sample to the end of a previous one by clicking the *extend* button.

The basic operations are the same as with Sonor, and the save options extend to Armadeus, Wav, Replay, Draw (waveform), Sprite (voice print) and Module. When it comes to effects, SoundLab lets you change the rate at which a sample is replayed, and you can choose to change the underlying sampling rate – interpolation – by integer, linear or cubic methods. The latter method gives the best quality, but is the slowest.

The software is very straightforward to use regardless of your sampling experience, and you can watch your samples in real-time via an oscilloscope/FFT.

!Speech – soft options

Sampling is not the only possibility, and if you want your computer to be able to speak what you write, there is another option. Superior Software originally launched Speech for the BBC B and this new version of the *phonetic vocaliser* enables your computer to communicate with you audibly. Type your phrase or word and the computer will speak it. Speech 2 has an extra 3,500 words in a completely revised exceptions dictionary, plus modification of intonation which gives better speech quality. An easy-to-use word editing facility lets you add you own words such as technical terms or place names. You can change volume, pitch and speed, plus the more technical parameters of:

Tongue: changes the second formant centre frequency

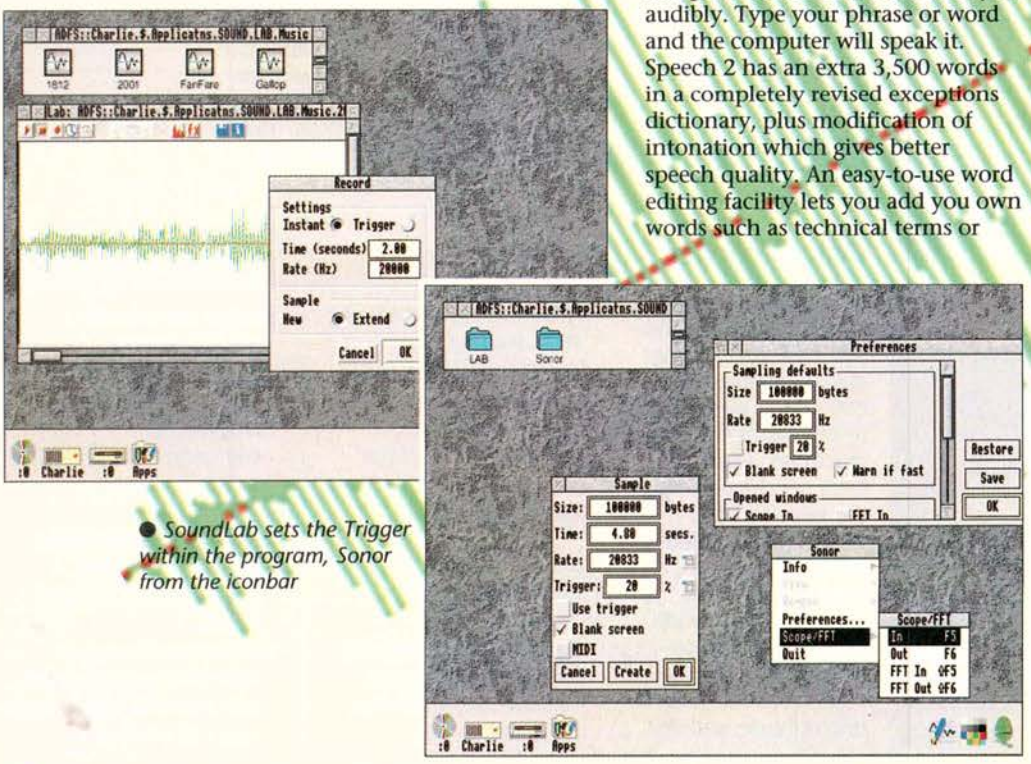
Mouth: changes the lower formant centre frequency.

Thereby you can change the sound of the computer voice to one more aesthetic or understandable. You can also opt to display the phonetic sounds by setting the reader to accept phoneme text.

Some word processors – in particular Full Phase from NW Semerc and Longman's Talking Pendown – allow this speech output as you type. You can update the older Speech module in these packages with Speech 2 simply and effectively. You can also buy Speech 2 in English, French or German versions.

You also receive a spelling test program with Speech. You choose between three lists – though full instructions on adding your own are included – and the computer speaks the word while a sentence containing the word is included to help put the word into context. This is an excellent program and the French and German versions will find a home in anyone's revision schedule.

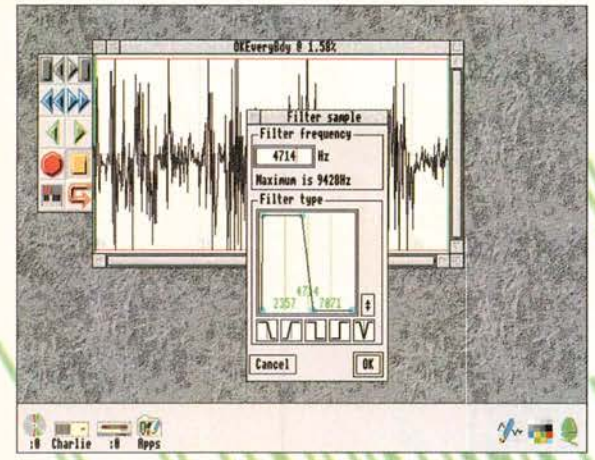
You can just use the program at this level, with a talking word processor, as a spelling test and as an interesting gimmick. However, there is an awful lot more to Speech 2 than this.



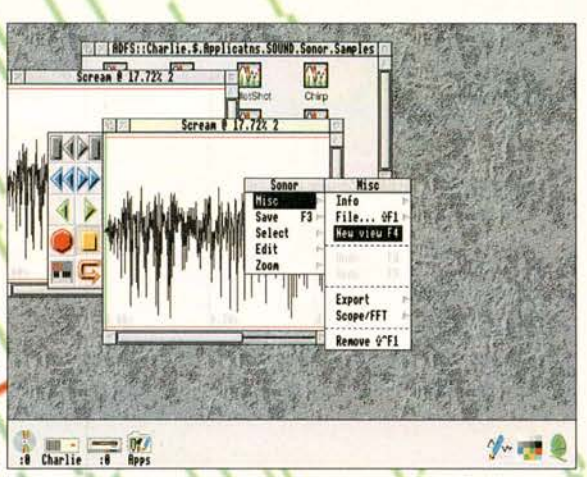
● *SoundLab sets the Trigger within the program, Sonor from the iconbar*

What are phonemes?

To add intonation to speech, for a more natural sound, simply place a number between one and eight after any phoneme. The higher the number, the higher pitch the phoneme will be. Selected phonemes – mostly vowels – are also lengthened for emphasis. Adding a question mark to the end



● *Filtering is fun even for the uninitiated*



● *The new view options allow you to play with new effects in safety*

of a phoneme (or word) pushes the pitch up, whereas adding a full stop pushes it down.

Pauses can be included by using spaces, commas or hyphens. If you do not leave a space between words, then the speech will flow together faster. This does not necessarily make the speech sound better, but can make sentences more fluent, especially with short words.

You can even make your computer sing to you by using a number to select pitches for each phoneme as well as adding pitches for spaces and ends of lines. Superior recommend lower pitches which tend to be more accurate.

For instance:
F F# G G# A A# B C C# D D# E
Octave 1 10 11 12 13 14 15 16 17 18 19 20 21

Daisy Daisy is included in the demo file which accompanies the package so you can deconstruct this to learn some clever tricks.

Phoneme	Examples
AA	After, fAst
AE	hAt, hAve
AH	cUp, dOne, villA
AO	fORt, lAW
AW	cOW, bOUGH
AX	hotEl, comicAl
AY	Acorn, pAle

How it works

Speech 2 comes with an Editor which allows you to add (or delete) *separate words* – one preceded and followed by a space. Accented characters are now accepted and four new phonemes have been added for use with foreign languages – NQ, OO, UI and UR.

To produce a new Speech module from a modified dictionary, drop the dictionary file on to the iconbar or Speech window, and use the Editor Save option. All the words are put in alphabetical order. The group called *other* is used by anything that doesn't start with A to Z, such as numbers, symbols and accented characters.

So, to translate the word *ARE*, you might use the entry: *are_AA4AX|* in the *.aa* group. To build a more complicated rule set, you can include checking for before and after characters. Using < and > you can make the S in *rivers* sound like a *Z – s<re> _Z|*.

This will first find the S, then go to the R and E. If the parser then finds a space to the right of S, a match has been found. You can also use wildcard characters. For instance, *a>#e_AY|* will check for a consonant after the A followed by an E. If correct, Speech will say the A as in *tame*.

● *Let your fingers do the talking*

Summing up

Although there have been a couple of other speech synthesisers, Speech 2 is the only one to have been upgraded recently and is used in the majority of junior class word processors. It's fun to play with as well as having a variety of useful applications, being able to mix education, entertainment and programming in one package. Definitely recommended.

When it comes to the samplers you have a choice: The VTi package is slightly cheaper and offers more control – especially over fades – and the manual is detailed and informative. Both have the ability to trigger and resample, but Sonor provides more effects and options.

Both can save samples as modules, but SoundLab does feel a little dated. However, it does do the job and not everyone will need the bells and whistles. Also, everything is presented in an easy to understand and simple to use manner.

For my money I'd opt for the VTi package, as it has the ability to accept Midi, and I may at a later date want to access the Midi Sampler which uses the same software. Also, as I use an A5000, Risc PC and A440, I can access all of them with the same interface with VTi's unit.

● *A whole new world of spelling tests*

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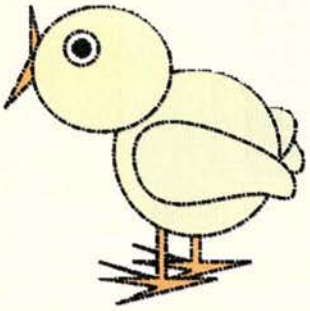
Spring into action

Steve and Anne Bruntlett produce some craft ideas

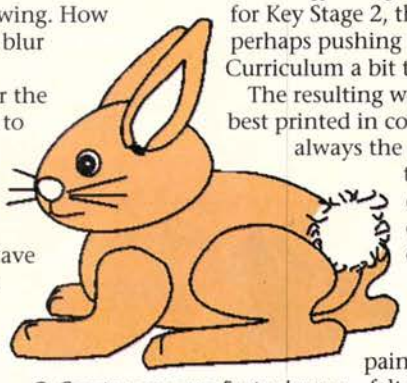


● *Chicken and (below) rabbit, sewing cards*

WE started preparing this article over the Christmas holiday, working in the dark as neither of us could remember how big a Cadbury's Cream Egg was. Don't you just love them, but are they smaller than they used to be or is that just old age?

Our youngest daughter was dispatched to try to find one of last year's eggs in the local discount store, but would you believe it, the new stock had arrived and the new publicity campaign on television was already in full swing. How the seasons seem to blur these days.

The publicity over the last few years seems to have centered around the phrase, *How do you eat yours?* So, not to be outdone, we have centered one of our themes for this article around the phrase, *How do you disguise yours?*



● *Create your own Easter bunny*

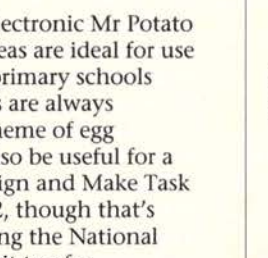
Quite why you'd want to disguise a cream egg we're not sure, but there is a rich cultural tradition of decorating fresh and boiled eggs in Britain along with all the egg-rolling competitions which happen on steep hillsides in country villages around Easter time. So, perhaps it's the most recent occurrence of such traditions, in this case made possible by the use of computer systems and its application to cream eggs.

Last year, on a business trip to America, we bought several Easter egg decoration kits. Americans seem to celebrate the arrival of the Easter Bunny in a big way for some reason, or so it would seem from what's on sale in the malls and supermarkets. Included on the cover and subscription disks is a collection of egg disguises which you should be able to add to or modify.

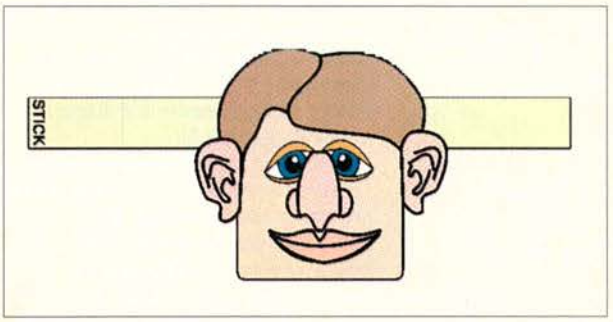
It's a sort of electronic Mr Potato Head kit. The ideas are ideal for use in nursery and primary schools where craft tasks are always welcome. The theme of egg disguise could also be useful for a Technology Design and Make Task for Key Stage 2, though that's perhaps pushing the National Curriculum a bit too far.

The resulting work would look best printed in colour, but as always the option is there to print out designs in chunky black outline form only, and colour the card printout with paint, crayons or felt-tip pens. The outlines could also be printed out directly on to coloured gummed paper squares or plain coloured paper, and the resulting shapes cut and assembled into disguises.

If the strip that holds the disguise in place round the egg is too short, say for a duck egg, then simply extend the strip to the required size. But remember to ungroup it from the face design, otherwise that will distort as you re-proportion the strip. To get the exact length of the strip needed to go round an egg, either use a tape measure, a piece of paper or string.



● *Sample some of these egg disguises*



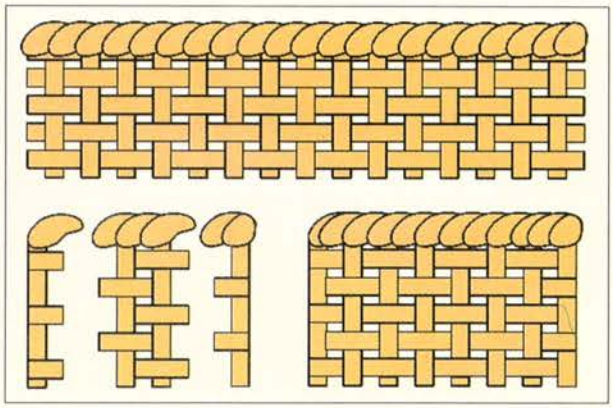
An egg is... egg-shaped

The egg disguises are accompanied with ideas for Easter cards and Mother's Day cards. As with previous collections of clip-art and project sheets, the resources can be stripped back to their individual components and combined in a variety of different ways. You could try using the flower heads from the Easter basket for decoupage work, as the basis for Easter bonnet decorations or for any other project for which you may need flowers.

Unfortunately, Easter has less and less to do with the death and resurrection of Jesus. As with the Easter Bunny, other fluffy animals such as chickens, and sometimes lambs, are associated with Easter or perhaps more broadly, with spring.

Easter as a festival is perhaps moving slowly back to its pagan origins, and is

➤



● *Sections of basket in construction*

➤

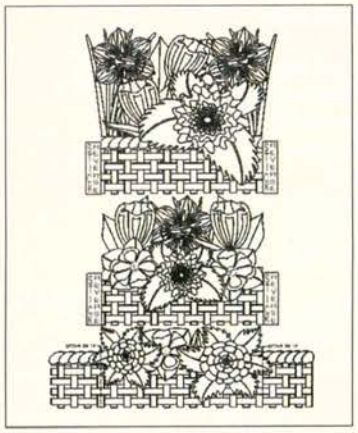
seen by most as a time for celebrating new life and growth and for swapping overpriced, hollow bits of chocolate wrapped in foil and packaged in cardboard.

Cotton wool is therefore a necessary material for Easter craft work. It can put the tail on a rabbit or a chicken and the fleece on a gambolling lamb. You could also use it to put a beard on one of the disguises – if you could come up with a serious reason for disguising a cream egg that is.

Thinking about Easter activities in terms of Key Stage 1 activities, there are many uses to which the computer can be put in facilitating practical work. Early learning sewing cards can be made by changing the outline of a drawing to a dot and long dash pattern available under the line styles menu of Draw and Vector.

As the *stitches* might still be rather small for small fingers to use, try working with a small-sized design and photocopying it at a larger scale directly on to card. Alternatively, try enlarging the design in Draw using the Magnify option available under the Transform sub-menu and then printing out and photocopying the sewing card design on to card.

● *Outline version of flower basket*



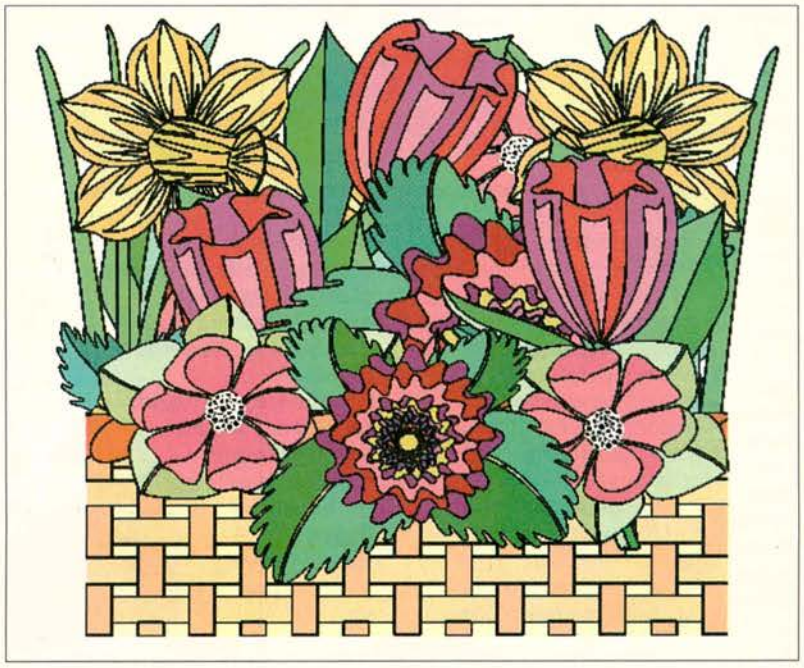
This is better achieved by working in outline and then colouring in by hand, as colour photocopying from colour print-outs can work out expensive except for the one-off special design. In terms of printing work in colour though, colour photocopying can work out cheaper than individual colour printing in some cases. It's perhaps more flexible and definitely quicker than printing lots of individual pieces of work and spray mounting them on to card.

The sewing cards provided here are based on designs used in other projects, and in just the same way, existing designs and motifs from other sources and previous drawing projects can be turned into sewing cards by changing solid lines to dots and dashes, and perhaps by simplifying the design. The dot and dash pattern and interval can be edited in Vector if you're using that in preference to Draw, which you should do if you're serious about drawing on the computer.

The example sewing cards are portrait format A5. If you want to make them into a folding A5 size card, enlarge the paper size to A4 landscape using the paper Limits submenu from the Misc menu in Draw, and move the drawing and text to the right hand side. Then print it out on to card and fold down the centre.

Smaller cards – such as A6 which go in a C6 envelope – can be produced by reducing the design by 70 per cent and placing it on the right hand side of a landscape piece of A5 paper. The rabbit could be scored and folded down the centre as an A5 card so that it could stand up in its own right.

Baskets can be made to contain mini eggs using the wicker pattern and a box net. The design is based on a section of woven basket produced for the Easter Flowerbox card design. Remember that when producing this kind of work, almost everything is recyclable in one way or another. Alternatively you could try your hand at an Easter biscuit recipe and put the decorated



● *Sections of flowerbasket superimposed to give a two-dimensional version*

● *Chrysanthemum, daffodil or poppy – add your own spring flowers*

biscuits into foil in an enlarged basket.

The basketwork drawfile has a long section of basketwork comprising completely ungrouped individual drawn elements, so take care if you want to manipulate this drawing. The shorter section comprises three modular middle sections and left and right hand end-pieces to make variable lengths of basketwork easier to produce.

If you want to produce basketwork to your own design specification, use the gridlock option set to a fairly course spacing to make sure all the elements line up, otherwise there may be inconsistencies. It may look fine on screen, but when it's printed, especially on a laser printer, you'll spot gaps and overlaps. Start at the left hand end, copy and place as many central sections as you need for a particular length of basketwork, and finish the strip with a right hand end section.

Three-dimensional cards are easy to construct using the kit provided, and the method can be adapted for use with any other designs you care to come up with. The card design can be taken apart and the groups of flowers used in individual panels for other types of cards. The individual flowers – daffodil, tulip, poppy, rosebud and chrysanthemum are provided separately in both colour and plain versions.

Everything's coming up roses

To see how the flowers were constructed, just ungroup them. Select a petal or leaf and then select Edit to see how the control points and nodes of the separate elements determine the shape. The poppy was constructed by starting with a circle and producing a rough petal shape, copying it, rotating it through 60 degrees, and moving it into place next to the original.

This process is repeated until you have enough petals to go round the centre of the flower. The leaves are done in exactly the same way apart from them being made from two separate sections. The petal and leaf shapes can be varied by a bit of editing to make them look less regular.

The tulip and daffodil were a bit more complicated to produce, but they use exactly the same principle. It's easier if you turn the gridlock off completely when doing this kind of free-form design, otherwise you can never get the lines into the right place. The flowerbox card designs are provided in penny plain or tuppence coloured to accommodate your working preference and conditions.

There are different ways of working which may be adopted when producing such a complex design. One approach is to design the flowers and produce coloured versions as you go along. These can then be assembled into the final colour version with no further changes.

However, I designed the flowerbasket on my A4 portable which I use for probably 75 per cent of my computer work. This is fine except for the fact that the resulting designs were produced in shades of grey which aren't very impressive when printed out, especially as they are supposed to be bright spring flowers. The final design was converted to black and white by applying a white fill across the whole design. This is achieved by selecting the whole design and selecting white from the Fill colour menu.

A black and white version is very useful for a variety of purposes, especially for those without access to a colour printer. But how do you produce a coloured version without ungrouping all the individual flowers, petals, bits of basketwork and so on?

Drawing alternatives

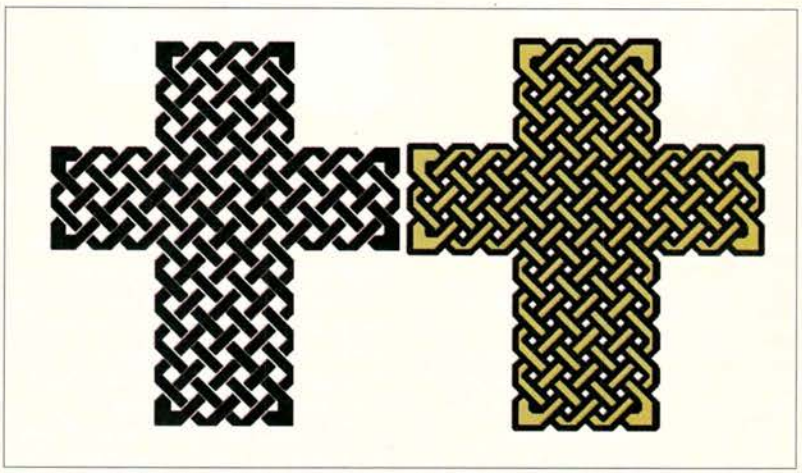
A simple solution is to use the excellent Chameleon 2 from 4Mation which allows you to colour drawings with flat or shaded fills by moving the pointer to the section of leaf, basket or petal that you want to fill, and then applying a selected colour or a shaded fill using a range between two selected colours.

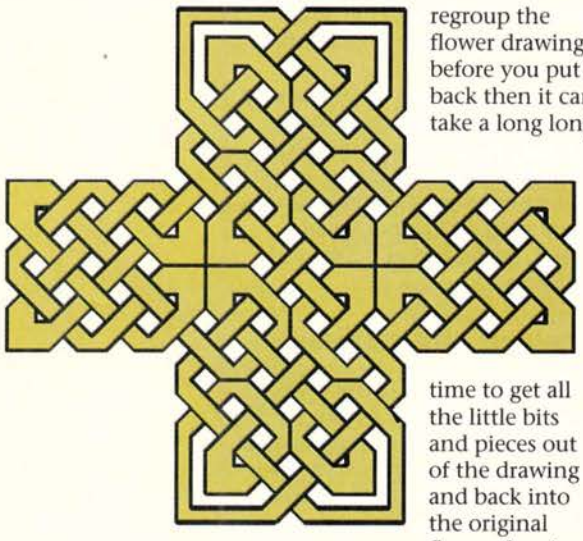
Chameleon 2 is much more powerful in that it can select colours from the standard 256 colour palette or from a substantially larger dithered colour palette presented in the form of a colour cube. It can darken or lighten colours selectively or globally, and do much more besides.

The alternative to using Chameleon 2 is to take a single flower out of a design, ungroup all the components of the flower drawing, recolour the bits which need the alterations, regroup the flower drawing, move it back into place on the main drawing, and if it doesn't look quite right, repeat the whole process again until you get what you want.

Be warned, this can take what seems like forever – even on a Risc PC. If you forget to

● *Celtic knotwork design (right and below)*





regroup the flower drawing before you put it back then it can take a long long time to get all the little bits and pieces out of the drawing and back into the original flower drawing.

With Chameleon 2 you don't have to ungroup or move anything. Just change the bits you want to recolour. The process is an absolute doddle and gives you total control over your colour scheme. If you look carefully when the drawfile of the flowerbasket is being drawn on screen, you'll see that some of the sections are the wrong colour.

This is because when you've only got small white sections a couple of pixels wide to aim at on different layers of the drawing, it's often difficult to tell if one particular bit is part of a flower, a leaf or a basket. However, the final appearance looks fine.

Whether the printout matches the on-screen original is a different matter, but Chameleon 2 gives you control at this stage allowing you to lighten or desaturate colours globally until the printout looks more like the kind of colours you originally intended rather than the colours your particular printer driver selects for you.

Hard copies

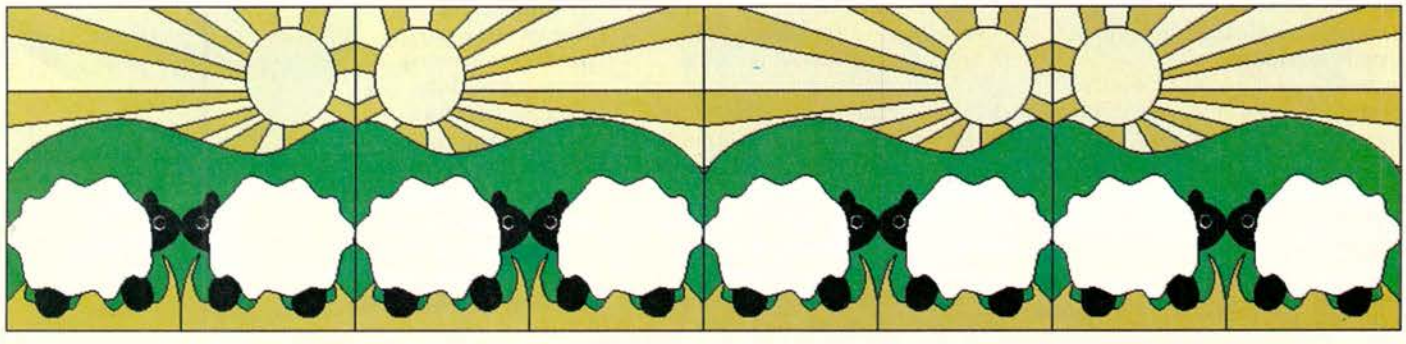
If you're thinking about buying a colour printer, have a look at the Epson Stylus at approximately £330 plus VAT. The quality of printout at 360 dpi is excellent, and the quality at 720 dpi has to be seen to be believed. It offers photographic quality from a good original. I've seen Photo-CD images printed on the Epson Stylus using the normal kind of coated paper that is recommended for use in top quality printouts. Pictures of stainless-steel and cut-crystal look like colour photographs. Quite amazing and also affordable for an increasing amount of schools – perhaps even for primary schools and homes.

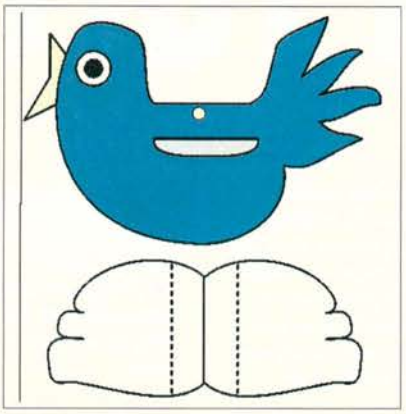
Back to design

Celtic crosses are sometimes associated with Easter, so we've included a few here for your delectation. Celtic knotwork is absolutely fascinating and seemingly very complex to produce, but as it's often based on a regular grid it should be possible to use the gridlock on a computer package such as Draw to ease the development and production of such knotwork.

The examples provided on the disks have been produced quickly and easily. The corner and edges sections can be embellished and distorted as much as you like, as they don't affect the rest of the design. You could elaborate them even more, as did the monks of

● *Decorate your simnel cake in different ways*





● *Add a hanging bird, Blue Peter fashion*

Lindisfarne Island in developing some of the knotwork into animal heads or natural forms.

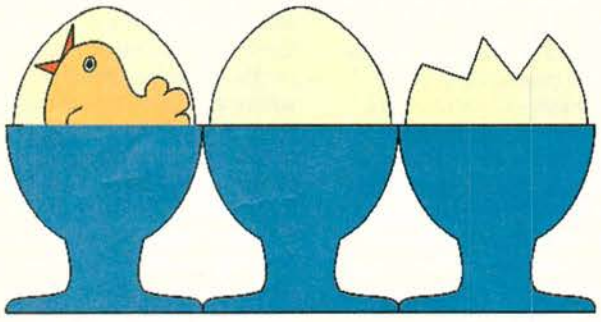
The crosses can be taken apart and made thicker or longer by repeating extra sections, so don't assume that you have to stick with what we've provided. You could include a verse in an uncial or mediaeval script to go with a Celtic cross design in making an attractive and intricate Easter or birthday card.

You could also include a packet of felt-tip pens with an outline black and white version if you really wanted to put someone's eyesight and patience to the test. Whatever you do, don't turn the gridlock off when modifying the designs or they'll never fit together properly. If you use gridlock, the sections will just slot together as if by magic.

If you're producing lettering for cards of whatever type, remember that if you use the *Change to Path* option to change the text to a drawpath, you can change the outline to a different colour or line thickness as well as changing the fill colour to make subtle changes to lettering. Drop shadows are also effective.

Experiment with text using fonts of different styles. The Skyfall font sets are particularly attractive and equally well priced. We used them for years with very few problems. You can buy something like 500 fonts for approximately £38, so there's no reason why any computer user shouldn't have access to a wide range of exciting and varied typefaces.

It wouldn't be the same if we didn't include a cake frill for your festive Easter cake, so there are a variety of designs included to use around your simnel cake. If you want to add a seasonal mobile to your Easter decorations or even a simnel cake, try using one of the hanging bird designs or any of the other spring motifs and hang them Blue Peter fashion from black cotton attached to garden wire or a shapely bit of tree branch with the bottom bit wrapped in foil.



● *A greetings card in three dimensions*

With greetings

We've also provided a range of Easter cards which fold together in a variety of ways.

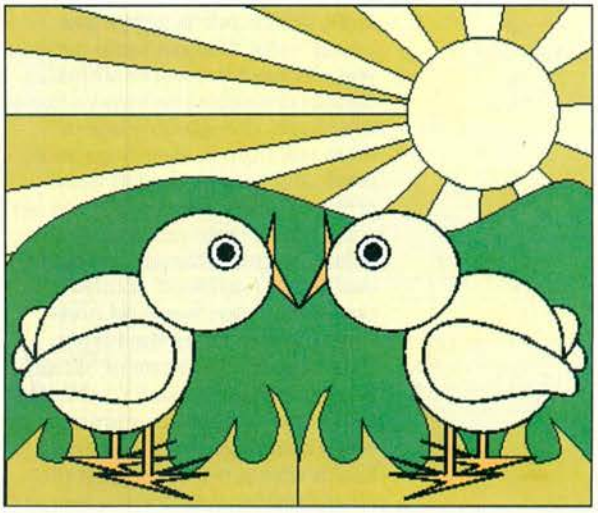
These can be modified as always. The cards generally come with instructions so the construction techniques are not detailed here.

The drawfiles can be printed and used as work cards in school or used to make your own Easter cards.

There is also a range of clip-art featuring chickens, sheep and so on. But as usual, we would encourage you to have a go at drawing your own animals as ours are far from being anatomically correct, as you may be able to tell if you look very, very closely.

Have a good Easter and have fun making up some of the designs on the disks. Experiment with what's provided and try and come up with your own designs. Surely everyone can draw a chicken! Even if your lambs come out looking like clouds, it's the thought that counts.

Try and see the designs as a springboard for developing your own. Use the clip-art provided as imported images for CardShop from Clares or develop you own card shapes, always remembering to design them to fit into commercially available envelopes – unless of course you want to make those yourself as well as the cards.



● *Celebrate Spring with your own designs*

All tarted up

AFTER last time's excitement with the Duchess' kitchen, you'll be glad to know that life is slightly less frenetic for a while in Wonderland. Anyway, move west twice out of the house and the peg is automatically removed from your nose – just as well really.

South, twice southwest and two moves southeast take you off the wiggly-waggly path to a wall, while a further move southeast gets you to a clearing. One step south from here puts you face to face with a caterpillar sitting on a giant mushroom quietly smoking a hookah. Give him the sherbet and you'll be given five points and some advice: *The left side makes you grow and the right side makes you shrink.*

He means the wossname, mushroom, of course – which is why you have painstakingly collected a pair of pouches – and bits of the aforesaid mushroom look exactly alike. So Max Kolombos advises the following precautionary moves here: North, drop right hand pouch, south, cut left side with knife, put chunk in left hand pouch and close left hand pouch.

Now return north, drop left hand pouch, take right hand pouch, south, cut right hand side with knife, put chunk in right hand pouch – and then cut again because you will need two of the shrinking chunks of mushroom before closing the pouch, though only one of them will fit in it. Finally go back north and retrieve the left hand pouch. You are now fully kitted out.

It's time to gain entrance to the palace, so go northeast, northwest, southwest, northwest, southwest, northwest twice, west and north three times to get to the Eastern Hall. Now for the moment of truth: Show the pass you purloined to the guard and, once safely admitted, you'll be mugged by the White Rabbit who is demanding his pink gloves and fan – pass them over and get a paintbrush in exchange.

Sadly, this column is my swan song. Sorry I can't finish the Wonderland solution, but there it is. I've really enjoyed contact with readers over the years I've hosted the Mad Hatter column. Take care now.

Bob Redrup

If you haven't got your *Items in room* window open at this point, you are likely to miss the presence of a guard door – which you should now open and go east into the guards' quarters. There are thirteen lockers – ho hum, which to open with all those choices? Well, since you have a number 10 key, why not try that one?

You will need to use quite specific input here for best results. Inside locker 10 is a key – to locker three. Inside that a key to locker seven. Inside *that* locker is another card – seven of diamonds – and a pair of boots. Take both. Now go west, up and west to the Queen's bedroom and take the card there. Next, open the queenside drawer and take the wooden key inside it.

From the bedroom go east twice to the bathroom and open the cabinet there to get the large lens and the nail varnish remover bottle. With the two lenses you now have the makings of a telescope. It's time to go west, down and west into the Central Hall where you will be impressed by a suit of armour and the Queen's coat of arms. Indulge in a touch of contumacy and take the coat hook, letting the magisterial coat of arms fall to the floor.

Next go west and then south into the Conservatory and continue your antisocial behaviour by entering the command *turn winch clockwise*. Oh dear, vicar, it came off in my hand – never mind, I expect it will turn out to be useful somewhere.

Now leave the conservatory and go to the kitchen by moving north twice and then west.

Ask poor cheffie about the piece of paper he is waving about so agitatedly and you'll find yourself lumbered with the task of providing him with all the ingredients necessary to make some treacle tarts. Start by taking the steak.

Next go down and unlock the cellar door with the key hanging nearby and then climb back up. Go east then south into the Western Hall, drop the boots and continue east, east, south six times then twice west. You'll find a puppy waiting to play.

Throw the stick you got from the stick insect into the river. When the pup retrieves it reward him with the steak and you'll get a silver key which unlocks the door set in the tree trunk two moves east, two north and one northwest from where you are. Open it but don't enter yet.

Now go southeast to the horse chestnut tree and put the cream into the saucer. The Cheshire cat will lap it up and leave you some sugar – the first ingredient for the tarts. Now go to the treacle well by moving northeast, northwest, east, southeast twice and then northwest.

Fix the winch handle to the winch, take the rope and tie it to the jug from the Duchess' kitchen. Drop the rope and turn the handle clockwise to get some treacle into the jug. Reverse the procedure, retrieve the jug and there is your second ingredient.

Moves northeast, northwest, west and three southwest take you past the beaver's hole to where a Jack of Diamonds is caught in some rushes. Next go northeast and east into the hole. Open the hatch and climb up into the cupboard – you are now chez moi.

The tub in the cupboard contains lard – yet another ingredient – and now go east into the kitchen to take the tea chest. Next go southwest into the breakfast room where the

napkin has some breadcrumbs on it. You *must* fold the napkin before you take it or you'll lose this vital ingredient for the tarts. And there we'll have to leave it.

Pawn takes all

Face to face with the Devil himself is where I left you last time in The Pawn – I'm a nice chap, really – so it's time to make amends and bring this entertaining adventure to a successful conclusion.

You start by chatting the infernal chap up, and I didn't find it easy to begin with. The input I finally tried was *Devil, hello* and that got the ball rolling. After that, it was a question of asking about that wretched wristband. The reply was that, in exchange for delivering up the soul of that crafty Kronos, the band will be removed. He also offers a potion to help in the task – and next thing you know you are back at the rope bridge.

You need to use the command *Look* here because otherwise you won't realise that the potion bottle wasn't actually put into your hands. Grab it and then stagger your way across the bridge once more and then go northwest into the presence of the magnificent dragon – who is a short-sighted plonker, actually. However, he is also short-tempered and nasty so start off by dying as you examine him to discover he has a squint. Save your position first, naturally.

Squints actually mean you tend to be long-sighted, but never mind. Eventually I worked out that I needed to point at the shadows: Dragon aims in that direction and then still threatens to eat you on account of the fact that he sees nowt. Fiat lux and all that, folks. Open the pouch to release the power of the white and then shine the white at the shadows. It took me an age to figure out this bit.

Anyway, thirteen hobbits are revealed and the dragon slowly fries and eats them – better than quick-fried pawn anyway, innit? Hairy little wossnames. Now dash north and prepare for swift action since you are precipitated into a workshop and Kronos. Again, much experimentation produced the following two commands, namely: *Throw bottle at Kronos, Press button on aerosoul*. Anyway, that's what you do to suck the sucker inside once he's dead. We are well on the way to that new name, namely Victor.

Now be patient and wait until all that is left is a pile of clothes. Look again and you'll discover that they consist of a pointy hat, a cloak and a wand: Wear the hat and cloak and take the wand. There is a little something else you have to do here before you can proceed any further, but it isn't impossible and merely requires close observation. Anyway, that's my non-spoon feeding bit for this adventure.

The next moves depend on your being able to imitate Kronos exactly – and so I suggest you save here and then experiment. Eventually you'll be allowed north on to the platform once you are wearing and carrying the right things. Down will take you to the circular room with the lava flow and the single exit north I told you to ignore earlier, so now go north having checked that your pouch with the white in it is closed.

North once more and east will take you back to Hell and the lad himself. Hand over the aerosoul and the wristband will soon be a shapeless blob on the floor. Time to scarper. Retracing your steps is as follows: West, south, west, up, west and west through the doors, open the pouch, take the rope and climb up before dropping it. Whatever you do, don't enter the command *Up* on its own. It must be *Climb rope* or variants, otherwise you are dead once more – guess how I know?

Move south five times, east, southeast, and south three times to some swinging perspex doors. Open the doors and move south where you'll see a cream coloured door. Knock on it and you will be asked if you are wearing a wristband. Say NO and the door will open. Go south again into a fuggy room where an exhausted programmer will give you a listing paper, asking you to fix it. If you examine the listing and enter the command *Debug* you can then wander around the game unscathed.

Odds and ends

Stephen Mumford had scored 92 per cent in Haunted House when he wrote to me, so any advice from him needs taking seriously. Here are a couple of helpful comments:

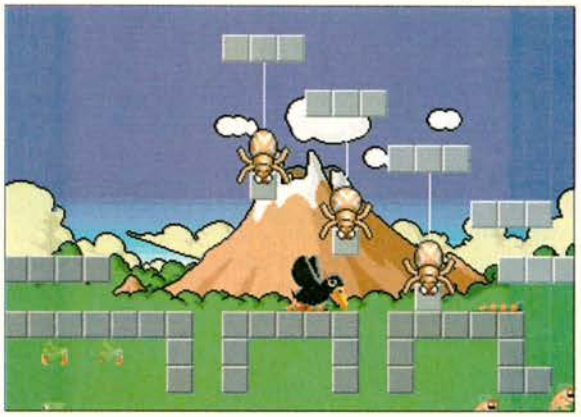
Once you have placed the two shoes in the shoebox and collected the red cod, fill the goldfish bowl with water, place the fish inside and drop the whole lot on to the mortuary table to receive a fishing trophy.

Stephen also says: *Positioning of objects is vital in the game – for instance, I spent a long time trying to pour the milk into the cat's saucer, and each time I failed, I had to reload the position. It* **is** *possible, but you need to keep trying – and saving your position, of course. Eventually I found that if the milk bottle was positioned so that it appeared to be standing in the saucer when Adjust was pressed, the milk normally found its way into the dish.*

As I write, the rumour mill has Elite III on the point of release and held up indefinitely at one and the same time. Ain't life wonderful?

I'm far too cerebral a chap to indulge in wild shoot'em-up games – but Wolfenstein 3D is a bit of fun, isn't it? At the end of Episode One, when the nice man says *Guten Tag*, give him a quick close-up burst with the chain gun, then scarper. Once you have lured him out with short accurate bursts from the submachine gun, get into his hidey-hole and you'll find a secret door on the right. Inside is an extra life and more ammo. Make a last stand here with the chain gun – he's got the key to the outside, so you must kill him.

...love on the run



● *Would you want them in your house?*

THIS is cute. Produced with younger players in mind you are in control of two lovebirds named, surprisingly enough, Sally and Wally.

The scenario goes something like this: Having just married,. the two newlyweds return to their idyllic treetop home. Horror of horrors, in their absence the place has become infested by several species of insects ranging from the common to the totally fantastic.

Understandably miffed by their discovery, the couplet set about the clean-up. With globules of green insecticide they stun the invaders and collect them for a later candlelit dinner for two.

There are six areas of the tree to negotiate – selected by choosing a frond on the palm tree. Then taking Wally or Sally or both, you set about the clean up. In total there are over 100 levels for you to work through, plus bonus levels.

Game options can be set from the iconbar, before choosing the player and locale with which to start the game. You can play any level at any time and there are 20 screens to each level.

Each screen is passworded too, which eases gameplay and the frustration factor, especially for younger players. I do like the fact that the options are available from the iconbar, as it means you can see at a glance what you are doing, and more importantly, can save settings for different players on to disk so that everyone has their ideal configuration whether you prefer keys, joystick or powerpad control.

However, as you'd expect, things are not as simple as they first appear.

For a start, something has happened to the floor blocks. Some are now slippy, others will only allow you to go in one direction.

Some bugs will release letters, which when collected will spell SALLY or WALLY and give you a bonus. Extra lives and more points are hidden in different creatures, and you may find yourself with a more powerful insecticide or the transformation of one of the duo to a well-hard bugfighter.

The occasional random throw will reveal extra blocks which will allow you to reach elusive nasties or gain entry to a bonus level.

If you don't stun the creatures before falling on them you'll lose a life. Lose too many and the spouse will have to take over. When all the bugs are dispatched, return to the start – if your other half is there you'll be rewarded with a kiss – and then on to the next level. Sally and Wally is very well thought out. For instance, if you have opted to play Sally in one-player format, you can change your mind half way through the game by pressing F1 to bring Wally into the fray.

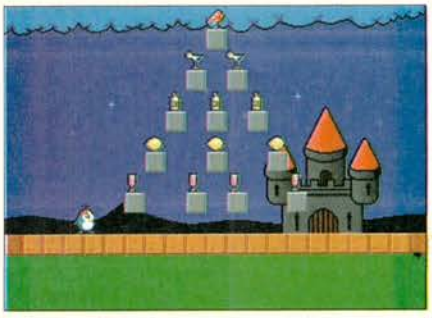
Furthermore, if you are playing a two-player game and lose all your hearts, you can play again pressing F1 or F2 up to three times. For children this is excellent as they can very soon get disheartened if they find themselves getting nowhere quick. With Sally and Wally, Oregan have succeeded in walking the tightrope between making a game challenging while keeping it fun and accessible.

The verdict? A very easy game to get into. The gameplay is simple to grasp, is enjoyable and has an addictive quality. Sally and Wally is smooth and professional with excellent animation, music and construction. It has everything you'd expect and need from a platform arcade game, including a sensible price tag.

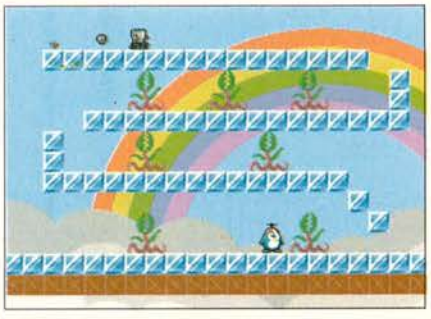
Pam Turnbull

PRODUCT SPOTLIGHT

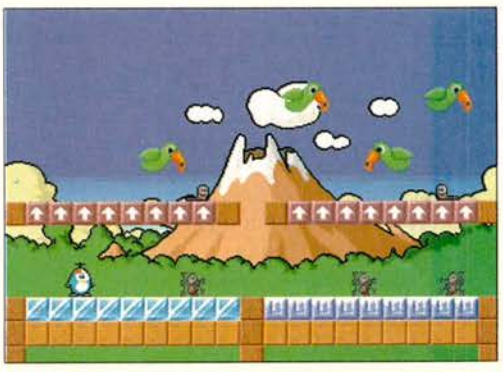
Price: £24.95
Supplier: Oregan Software Developments, 36 Grosvenor Avenue, Streetly, Sutton Coldfield B74 3PE.
Tel: 0121 353 6044
Requirements: RISC OS 3, 2Mb ram



● *Go for the bonus – you need all the help you can get*



● *Okay, so perhaps vegetarianism is a good idea*



● *Watch your footing there Wally*

Desktop Hacker

Cheating all the way

PRODUCT SPOTLIGHT

Price: £10
Supplier: Doggysoft, 7 Blackhorse Crescent, Amersham, Bucks HP6 6HP.
Tel: 0494 431916

IF you're going to play a game to completion, there are two ways you can go about it. You can play the game faithfully, refusing to give in until your reactions are honed and your timing is perfect – until you are at one with your machine. Or alternatively, you can dive into the code and have a good old-fashioned fiddle.

Regular readers of *The Databay* will realise that I favour the latter technique, partly because it allows me to leap to sections of a game easily, find all those hidden features and take hundreds of screenshots. But it's mostly because I get a great deal of satisfaction from surprising the end-of-level guardian with a turbo-charged rocket launcher.

Placing my personal habits aside for the moment, the Desktop Hacker from Doggysoft is an ideal tool for any internal modifications you may wish to make. It allows you to interrupt the flow of the program in any place and search through the memory for any data you're interested in. This enables you to alter the variables used by the game, and after a bit of practice you'll find that lives and ammunition don't seem to run out quite as fast.

● *Making the right choice*

● *Who say's this screen is impossible?*

The package is supplied with a whole host of stand-alone cheat modules, so the chances are that you won't have to delve into the complications of hacking immediately. The modules are activated by combinations of keypresses – they've been featured on numerous MegaDisks, so if you're interested, take a look.

Desktop Hacker is a completely rewritten version of the original Hacker, and its simplicity of operation still impresses me. It's hard to adequately sum up the functions of this well-crafted application in this short space, and all I can say is that if you fancy performing any form of machine code surgery on your favourite game, then Desktop Hacker really is the business.

HAL

Game On!

... never, say never, again

YOU have finally saved up for your Risc PC and are eager to load those old favourite games. Horror of horrors they don't work. You alter the monitor settings, load from floppy, load from the hard disk – nothing. In despair you realise that you'll never be able to play Swiv again.

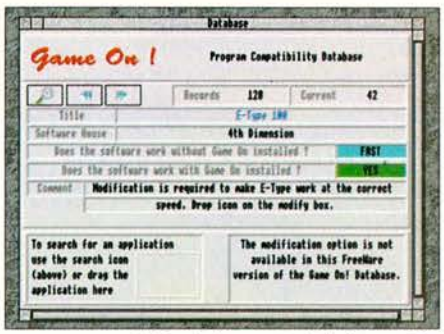
The ARM Club have come along with a solution to this in the form of Game On! This installs on to your hard disk and promises continued playing power regardless of your new machine's game requirements. This is then set to your monitor, so if at a later date you want to upgrade, you'll have to change these settings.

Most games can be played quite happily on the Risc PC, although this is sometimes in a thinner *letterbox* mode. Game On! allows you to access these games in their full screen glory via its new monitor definitions which can be set to appear on start up if this is what you require.

Most people will want to access the program when they want to play certain games only and Game On! comes with its own database which will tell you at a glance which games need to be run with it. You can print out a copy of this for desk reference as well. There is a note field in the database which contains comments such as that some games will work with Game On! but too fast.

Some games will need additional modifications and information on this is given in the database. To modify a game drag the icon to the box right corner of the window. There is a freeware version of this product and to modify a game you'll need the commercial product.

Apart from this the only other part to the program is the setup window which lets you automatically set options such as the V-Sync rate, have the screen emulate an Archimedes, kill modules on quit and control precisely the horizontal and vertical shifts as well as the horizontal border end. Some games do need changes to be made here but again the database is the fount of all knowledge.


Database
Game On !
Program Compatibility Database
Records 120
Current 42
Title
E-Type 1M
Software House
4th Dimension
Does the software work without Game On installed ?
FAST
Does the software work with Game On installed ?
YES
Comment
Modification is required to make E-Type work at the correct speed. Drop icon on the modify box.
To search for an application use the search icon (above) or drag the application here
The modification option is not available in this Freeware version of the Game On! Database.

● *Don't lose out with Game On!*

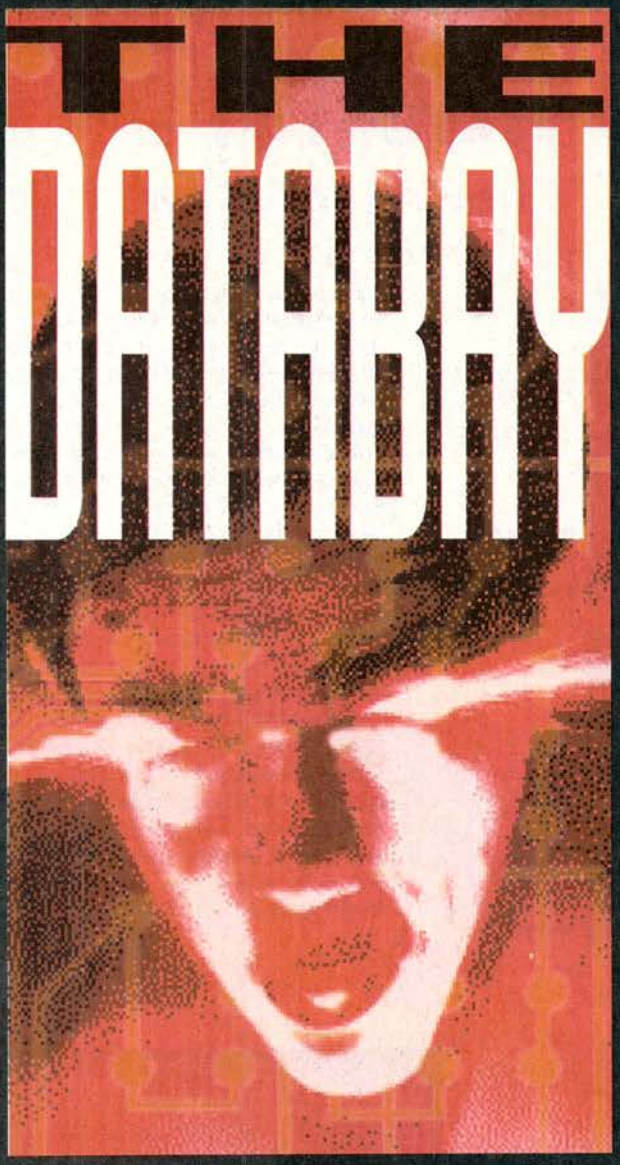
PRODUCT SPOTLIGHT

Price: £10 (inc VAT)
Supplier: ARM Club, FREEPOST ND6573, London N12 0BR.
Tel: 0171 624 9918
Requirements: Risc PC

At the price this is a must for someone who wants to be able to play old games on their new machine. An excellent utility which is easy to use and above all – it works.

Teri Paul

THE DATABAY



HAL logs on for the last time

IN this final column, I intend to take stock of what's happened over the past year or two and have a look at what might happen in the future. We've come a fair way and we've been treated to some awesome releases in the last few months. Everyone has their favourites, but I can't leave the scene without mentioning a few of mine.

Firstly, there's **Star Fighter 3000** – a game that positively overflows with playability. I was privileged enough to see the game develop from its infancy, and even then I had to scrape my jaw from the desk when I caught sight of the final version.

Congratulations to FedNet on their first independent release, and here's hoping that they find the time to apply their advanced graphics techniques to a certain racing game in their repertoire.

Another programmer destined for the big time is a chap named Eddie Edwards, of **Wolfenstein** fame. This conversion came pretty much out of the blue, and impressed the guys at Id Software with its quality. The game itself is a touch old, but it's a true classic and Eddie captured its spirit perfectly. Somehow, I don't think we've heard the last of him – keep your fingers crossed.

TBA leapt back into the market recently with a new style of racing game and a complete three-dimensional graphics engine. **Formula Two Thousand** was snatching people's attention at the Wembley show, and the ideas that TBA have chalked down look set to make a few eyes bulge here and there.

I've lost count of how many times it's been upgraded, but that old stalwart **Spheres of Chaos** by Iain McLeod is still a firm favourite of mine. Now boasting up to eight players and enough aliens, black holes and warped explosions to satisfy anybody's appetite for destruction, it's a tremendous example of a title where a lot of thought has been put into gameplay, and it shines through.

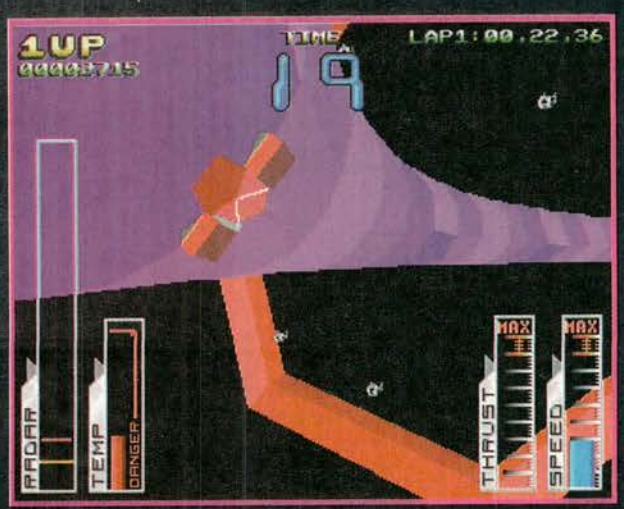
I couldn't possibly ignore **Sim City 2000** either – this excellent conversion by Krisalis has seen me spend many a long hour madly clicking on a barren piece of ground in the vain hope it would evolve into a beautiful, functional town. Unfortunately, most of my efforts tend to look the same – the sort of structure you'd get if you took a slice of London and inverted it.

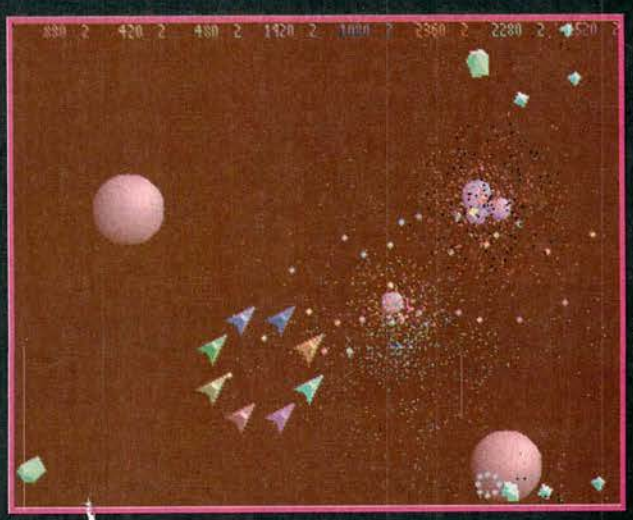
The Risc PC and the PC Card

The almost instant PC compatibility provided by the Risc PC is a bit of a mixed blessing when it comes to the subject of games – the existence of such a device will allow people to take their pick from the gargantuan number of titles in the PC world, but it could also have an adverse effect on the production of games for the Acorn itself. After all, what's the point in paying a programmer good money to convert a title that an ever increasing share of the market could run in its native form?

However, I'm tempted to be a little more optimistic. Firstly, the card that most people will be purchasing is the Acorn 486SX model – not really the cutting edge of processing power. Soundblaster support will be

● *Give your escaping POW a little extra help*





● *FedNet took graphics one step beyond*

through a separate Acorn sound card, so until that comes out, your games will be somewhat aurally challenged. On top of that, the Risc PC market is still pretty small so for the moment at least, the Acorn conversion market is in no danger of drying up.

On the other hand, the recent technological advances made by Acorn can only boost the quality of our home-grown titles – I believe, with enhanced graphics and the prospect of improved sound and multiprocessor boards on the horizon, we're in for a rapid journey into the heart of arcade country. Peripherals have also been taking off recently, and as the number of joypads in circulation increases, we should see more games that make full use of them.

As mentioned in a previous issue, TBA intend to implement a virtual headset for the Acorn – although too expensive for general home use, a headset coupled with a multiprocessor Risc PC would produce an arcade setup of monumental power and realism.

Is the CD such a good idea?

If you've glanced over the console market recently, you'll know that most of the *next generation* models use compact discs as storage – they're cheaper to produce than cartridges and provide an easy way of souping up the graphical and musical content of an otherwise straightforward game.

At first sight, it looks like the ideal medium for the future, but it has some problems. To start with, the data transfer rate for your humble CD drive is pretty slow, and the promise of true interactive video fades away when you have to wait for a couple of seconds for the player to grab the footage that you need. So far, these *interactive* games consist of a whole host of video clips, with a finite number of decision points which allow you to alter the plot.

Although this technique can result in games that are visually stunning with *full motion video* splashed over the screen, all too often it transforms the gameplay into the electronic equivalent of a cheap multichoice adventure book.

However, it has to be said that CD-based games are still in their infancy, and with any luck they'll outgrow these shortcomings and prove themselves to be the next step in storage. Until some serious improvements are made in the field of motion video and its playback, I don't think it should be relied upon to tie a game together – I'd prefer the computer to perform most of the image generation, with high-quality clips dotted here and there as interludes.

Bolting on a CD player to a mediocre computer doesn't magically increase its prowess at playing games, but when used in the right way it should be able to enhance playability. I'm looking forward to comparing the floppy-based version of Gamesware's *Simon the Sorcerer* to the improved version being marketed on CD-Rom.

Talking of which, there's something else to bear in mind. At the moment, the number of CD drives in use must be a fairly small slice of the market, although Acorn's recent promotion will have helped.

I don't think we'll see too many titles released in the near future, but as prices drop and speeds increase, the CD drive will become more common-place – and who knows, for the ultimate in games compatibility, it might some day be possible to buy a 3DO card for your Risc PC.

Cheat corner

Just to round off the proceedings, here are a couple of cheat modes for two of my favourite games. Firstly, in Cannon Fodder, try entering the word **JABULA** where you normally enter a filename while saving a game. The cheat mode should be activated, and on returning to the game you can skip levels by pressing F10.

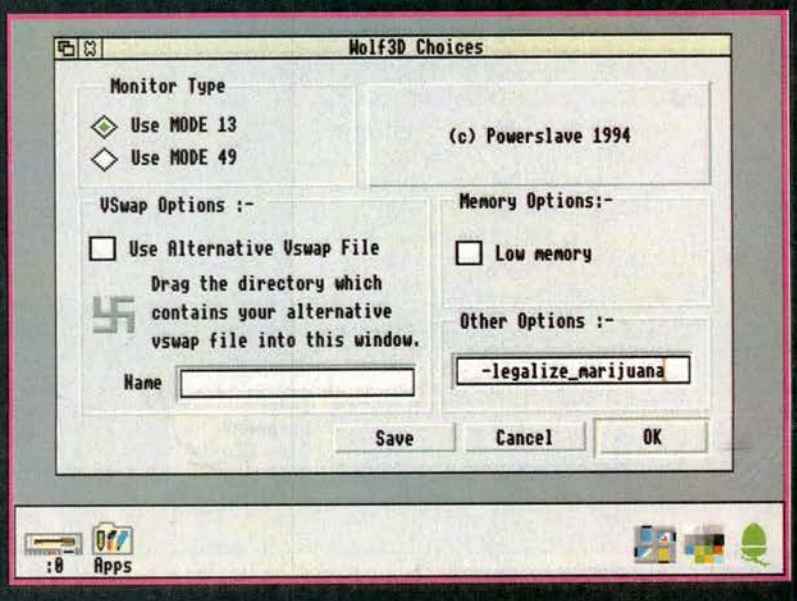
For Wolfenstein 3D, enter **-LEGALIZE_MARIJUANA** as an option in the Wolf desktop application before running the main game, and when it's finished loading you'll have access to the cheat mode. Holding down both Alt keys and pressing the following keys have some interesting effects.

X	Extra guns, ammunition, health and keys
N	Next level
C	Toggles clipping mode, allowing you to walk through walls
G	Toggles the so-called God-mode, giving you invulnerability.

That's all, folks

And so the show comes to an end – there's nothing more for me to say except to express my greatest thanks to everybody who has contributed – and special thanks must go to all those software companies who put up with my awkward questions and never-ending demands for screenshots. I wish the best of luck to all the coders out there – may you continue to provide the Acorn with the high standard of games it deserves. I hope you've enjoyed the nuggets of information I've been able to offer – I've certainly enjoyed digging them out.

One final word – although the Databay may be closing its doors for the last time, I'm in no mood to start unplugging my joypads just yet. In the words of an acquaintance of mine, *I'll be back.*



● *Just add seven friends*

Too riscy or not – that is the question

Teri Paul takes a look at the 32-bit world of PD and shareware

I HAVE upgraded my A5000 so that it has a nice amount of memory, hard disk space and a CD-Rom. I have RISC OS 3.11 and for my purposes the lack of vram doesn't keep me awake at nights – I've even got an Aleph One PC card fitted. Call me a heretic but I don't want a Risc PC, I have access to one and that's enough. If my needs change or the software demands it, I'll change my machine.

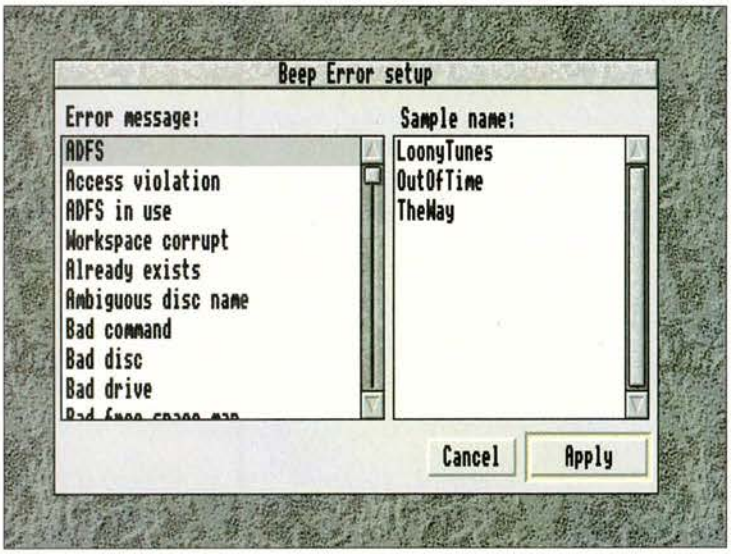
If money or inclination means you join me in my stand, there are a couple of utilities to cock a snoot at those Risc PC powermongers. Modes for instance gives you a Risc PC-style Display Manager on your RISC OS 3.1+ desktop.

A display manager icon sits to the left of the palette icon on the iconbar which means you can edit palettes should you want to – it's too complicated to do that on the Risc PC. Clicking on the icon lets you select resolution and colour combinations. When you make a selection in one field, the other may change, if necessary, to find a suitable mode. Your last selection always takes priority. When you have chosen the screen mode, click on Change.

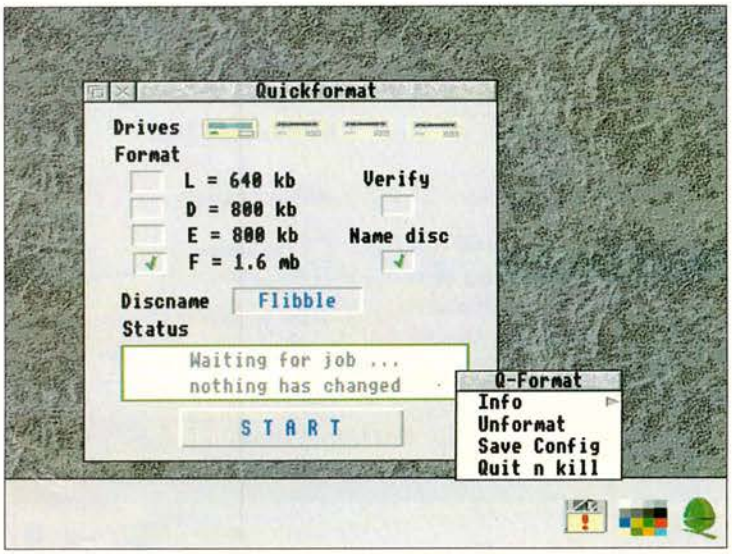
With Modes comes a Monitors files which contains some monitor definition files Peter Greenham prepared earlier. There should be at least one that will work with your system – just drag the one which best fits on to the iconbar. You'll be warned if the files don't know the current screen mode.

Along similar lines comes Resources II from Kevin Puplett. You will need RISC OS 3 but this program emulates the Risc PC's ability to add your own apps to the resources directly. Resources II provides a second Apps icon on the icon bar. On your hard disk create two directories called Apps and Utils and then you can put your favourite/most used programs in here and access them by clicking Select and Adjust respectively.

To save moving your applications around you could create virtual applications. This is simply done by creating a new directory in the apps directory and creating an obey file and saving it as !Run. Then create another obey file and save it as !Boot. Full instructions are given in the help file.



● *You can sample tunes or even voices and add them to BeepError*



● *Speedy format with a safety belt*

A tiger by the tail

Tiger is a multitasking desktop utility for the Acorn 32-bit machines – including the Risc PC – with RISC OS 3.1+. One major complaint with RISC OS file and directory names is that they are restricted to 10 characters. Tiger aims to solve this – I'll let you work out the pun, just think about catalogues – by providing a window where you can enter up to 110 characters for each object.

The descriptions are stored in a datafile within the relevant directory. In fact, Tiger looks and behaves very much like the Filer and – according to author Graham Crow – is intended to complement it. Just drag the contents of a Filer window on to Tiger and the object descriptions are read and displayed. You can then browse the directory hierarchy.

As normal, any executable object is run by double-clicking and you can add or edit descriptions at any

time saving them as data or text. If you drag an object from Tiger to a different Filer window, the description is automatically transferred too.

Why would you want this? The Apple Mac has a limit of 200 characters but practically this comes down to 32 characters and I think this may be the case here. However, in development work I can see Tiger being very useful indeed. But the bottom line will be if this fits in with your way of working.

Tiger is shareware and registration costs £15. If you think this is a bit pricey, you can try out a PD demo of the application.

I heard that, pardon

With my penchant for sillies, one of the things I particularly like on the Apple Mac is the ability to add samples to different errors. I gather a commercial program to do just that is under development, but in the meantime, look at BeepError.

Written by Piers Wombwell this is a desktop patch which changes the system beep to a chosen sample. You decide which error produces which noise. Double-clicking reveals a list of errors categorised under ADFS, SparkFS and ArcFS. Alongside is a lit of samples loaded into the program – you can add your own as you want by copying them into the Samples directory in the application, or add new errors too.

Errors reported by Filer_Action are not intercepted, so the sample isn't played. All you need to do then

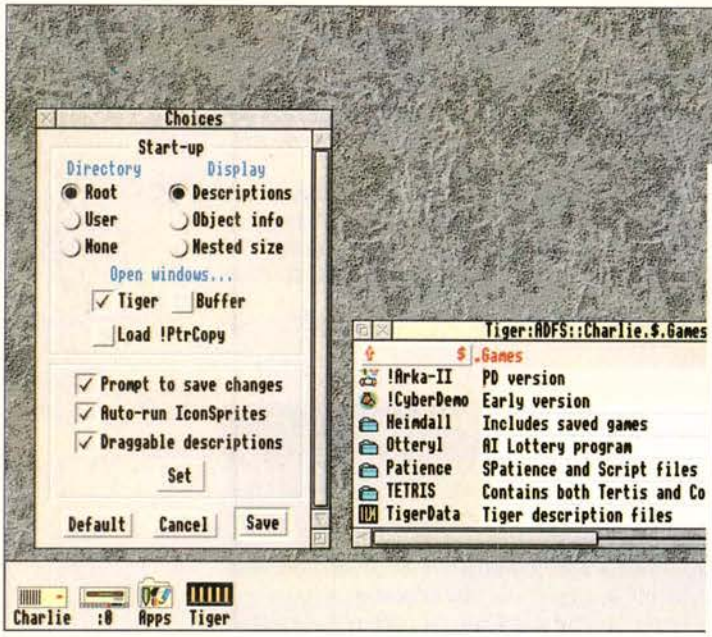
➤

Online to the world

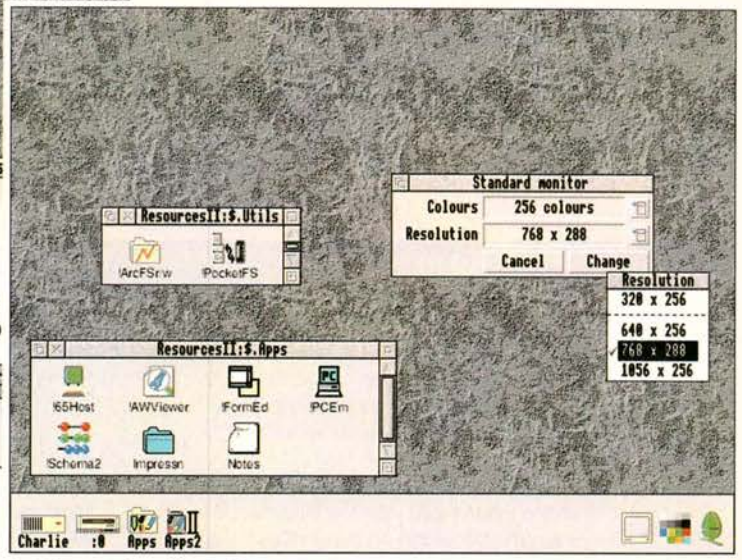
There are a *host* of utilities and programs to help you with getting online. Some require a good knowledge of what you are trying to achieve, whereas others want to open this resource to as many people as possible. As they say, you pays your money and takes your choice:

Coster	Online Cost Monitor displays the cost of your current phone call while you are on line, plus a countdown of the number of seconds left in the current cost unit. The Menu button lets you select the type of call. Particularly useful if you are using CIX.
Gopher	Gopher client with an updatable list of Gopher servers held in <Gopher$Dir>.Servers. To use, pick a server from the list and click OK. Double-click on any item to fetch it. Text pages are displayed in a page but can be saved to disk. Directory listings are as you'd expect them. At present, images are currently assumed to be GIFs, even if they are JPEGs.
EasyMail	Written in SBase, this news/mail/bulletin board reader includes facilities to handle CIX and allows indirect access to Internet. Unlike other readers it doesn't assume you are connected to Demon. Also handles batch as well as direct news access.
Mail	A mail reader which uses in-built Edit. If you have any mail it will be sent to !Edit and opened. To send mail, write your message in a textfile and drag this to the !Mail icon. A window opens for the user name and message.
Mailer	Another mail and bulletin board browser. Basically a desktop editor which is capable of displaying messages in Edit with the ability to rejoin split uucode.
NetReader	An offline reader of newsnet messages downloaded from the CIX Internet server. Still in development but well worth keeping an eye on if you are a CIX user.
OnTime	Sets a maximum amount of time to be online and warns you if you exceed this.
ReadNews	News and mail reader designed to complement RUCP 0.11 which receives news batches and unpacks them. The reader allows you to access, edit and post articles to the net.
RiscyTNC	Terminal program for Ax25 Terminal Node Controllers.
RloginD	By creating a TaskWindow connected to the serial port you can execute CLI commands from a terminal or other computer while someone else is using the desktop. See the telnet directory for an example of how to login to the Archimedes from a remote machine.
RS232stat	Simply monitors the status of your serial port.
SLIPdial	Archimedes SLIP (serial line internet protocol) software does not come with a dialler of its own. You can use a commercial comms product such as Hearsay but this program takes less memory. If you want a SLIP dial-up line which doesn't permit use of permanent IP addresses, rather assigns them dynamically as people connect, SLIPdial can be made to capture the assigned IP address from the server and generate an AutoExec configuration file for !TCPIP before starting it.
SparkMail	Simple ARCmail packer in conjunction with !Spark. Outbound files are added to a PC format archive with PC-style names for sending the ARCmail to other PC systems.
TCPIP	KA9Q Internet software package – an implementation of the network protocol family originally created as part of the Arpanet project. The protocol family is commonly referred to as TCP/IP – acronyms for two of the many protocols included. Needed with servers which allows direct Internet access such as Demon, and comes with the directories !MailDir containing the mail files, and !BM which is the mail sending/receiving program. Version 2.01 is only suitable for RISC OS 3+.
Term7Cost	Calculate the cost of all the calls made using the Arcterm7 comms package.
Web	Multitasking world wide web viewer. Still under development but looks promising.
WimpLink	Integrated packer/mailer/tosser/reader package requiring no separate and additional applications to run, apart from a text editor and an optional compression tool – Arc, Spark or SparkFS. Intended for use in FidoNet and FidoNet-compatible networks.

● *Comms software supplied by: Eureka PD, Five Star Marketing, Digital Phenomena*



● *File names have never been so informative*



● *Who needs a Risc PC?*

➤

is assign the sounds to the errors – which are then greyed – and click the Apply button. I would have liked a try option, but this is already on the wishlist.

Bits and bobs

Would you like to win the lottery? Of course you would and a lot of people – though not in the sensible Acorn market – are trying to make their million in selling you programs to do just that. But ask yourself this: if they knew how to win would they be selling the program?

Camelot have invested in a mechanical random number generator and Chaos theory says you'll never be able to predict what comes out – so the most you can hope for is a program which will calculate the odds on the numbers chosen in the past, and the most likely numbers to be chosen this time, thereby upping the ante on you winning a big prize. But basically, rolling a dice or using a pin is just as effective.

Alternatively, write yourself a random number generator – Basic has one built in. Oops, did I mention programming? Well you could always opt for Rich Kavanagh's shareware, Lottery.

Speed is of the essence

German-based Mike Gasbers has created Quick-Format. As you'd expect it aims to format ADFS disks quicker than usual. You can format up to four drives in L, D, E or F formats. You can opt for verification and naming the disks and when you've decided what you want – press start.

There is a little more to it than that though. The disks will have to have been formatted before as it is really *wiping the disks* rather than formatting them. This means that you are able to *unformat* them via the iconbar menu. You can also save the settings as your default values from here as well.

PD LIBRARIES

8-BIT HOUSES

8-bit Software, 17 Lambert Park Road, Hedon, Hull, East Yorkshire HU12 8HF.
BBC PD, 18 Carlton Close, Blackrod, Bolton BL6 5DL.
HeadFirst PD, 97 Chester Road, Southport PR9 7HH.
JJF PD, 49 Hollyberry Close, Winyates Green, Redditch, Worcester B98 0QT.
Masterdisc, 2 Seaview, Hoylake L47 2DD.

32-BIT HOUSES

3PD Swapshop, 66e Picardy Road, Belvedere Kent DA17 5QN.
Alpine PD, PO Box 25, Portadown, Craigavon BT63 5UT.
APDL, 39 Knighton Park Road, Sydenham, London SE26 5RN.
Arcaynia, PO Box 1927, Sutton Coldfield B74 3QZ.
ArchAngel PD, PO Box 41, Exeter, Devon EX4 3EN.
ARMistic PDSL, 136 Wellesley Road, Ilford, Esex IG1 4LJ.
Australian RISC, 241 Hawkesbury Road, Winmalee NSW 2777 Australia.
Beebware PD, 83 Forest Road, Huncote, Leicester LE9 3BH
Cheap PD, Greenways, Grubwood Lane, Cookham Dean, Maidenhead, Berkshire SL6 9UB.
Craig Beech PD, 30 The Deerings, Harpenden, Herts AL5 2PE.
Datafile, 71 Anson Road, Locking, Weston-Super-Mare, Avon BS24 7DQ.
Datastream, 34 Norbreck Close, Great Sankey, Warrington, Cheshire WA5 2SX.
Different Ideas, Eyton House, Eyton, Leominster, Herefordshire HR6 0AG.
Digital Phenomena, 104 Manners Road, Southsea, Portsmouth, Hampshire PO4 0BG.
DigiTech, 20 Downing Crescent, Bottesford, Scunthorpe, South Humberside DN16 3LS.
Eureka PD, 78 Rawlinson Road, Southport, Merseyside PR9 9NE.
Five Star Marketing, 4 Shepherds Walk, Bushley, Herts WD2 1LZ.
HeadFirst PD, 97 Chester Road, Southport PR9 7HH.
LowCost PD, 6 Furzeland House, Sheephouse Way, New Malden, Surrey KT3 5PH.
Lunchtime Disk Magazine, 203 London Road, Chesterton, Newcastle, Staffs ST5 7HF.
Moonlight Graphics, PO Box 3569, Cape Town 8000, South Africa.
Naked PD, Fayence, Fulford Road, Fulford, Stoke-on-Trent ST11 9QT.
Planet PD, 37 Manor Drive, Berrylands, Surbiton, Surrey KT5 8NF.
Skyfall, PO Box 2220, Birmingham B43 5RZ.
Solar Flare PD, 2 Moor Park, Eaglescliffe, Stockton-on-Tees, Cleveland TS16 9HB.
The ARM Club PD Library, 19 Woodberry Way, London N12 0HE
Westbourne Services, 34 Bradley Street, Wooton-under-Edge, Gloucester GL12 7AR.
Xi Software, 1 Avon Drive, Alderbury, Salisbury SP5 3TA

Structural views

Steve Turnbull decides how best to represent objects

THE guru of all computer programming, Prof. Wirth, stated the fundamental principle that *Data Structures plus Algorithms equals Programs*, and who am I to argue? The point being that an algorithm describes how you do something, the data structures are what you do it to, and given the former doing something to the latter, you have a program.

I must admit I would add something to this:

```
Data structures + Algorithms + User
Interface = Usable programs
```

but that's just me.

So now we have the problem of how to represent the objects within the real 3D graphics software. To do this we have to work out every piece of data that we're going to need.

On the surface

An object – from the outside – is composed of surfaces – perhaps just one smoothly curved surface, a number of flat surfaces or a combination of both. For example, a cylinder has three surfaces – the top, the bottom and the curved body – a cube has six flat, square surfaces, while a sphere has just one surface. Some examples are shown in Figure I.

Now we won't be dealing with curved surfaces – they take too long to draw – so we can safely say that all our surfaces will be sets of polygons. *Sets* of polygons? Well, let's take that example of a cylinder.

We're not using curved surfaces so if we want a cylinder how can we represent it? Figure II shows a progression of possibilities, each one slightly more accurate than the one before, but as the object becomes more complex the memory required increases too.

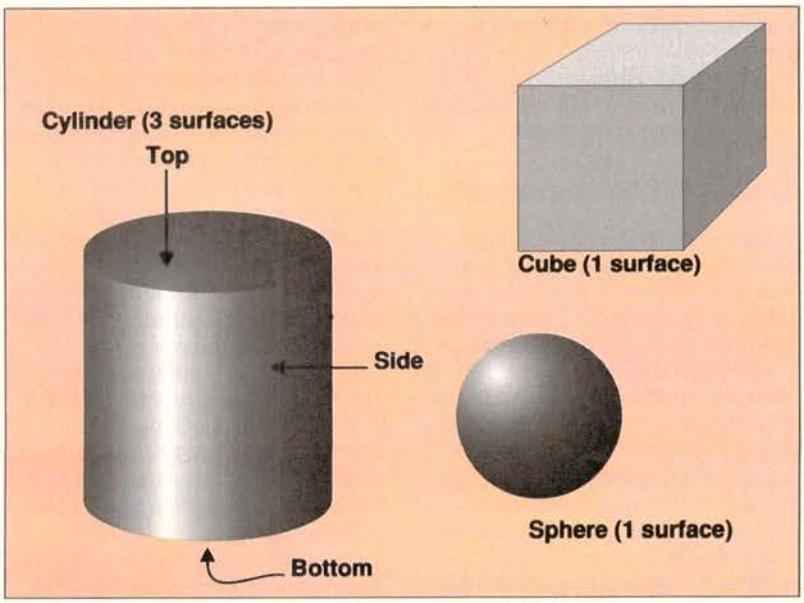
But we still say that the approximate cylinder has just three surfaces – it still has the top and bottom, but each of the vertical rectangles is part of the body surface.

So in the representation of our world we can say that any individual object will be a collection of surfaces defined by corners, which are technically called *vertices*. A surface will have just one set of physical attributes – just one colour, and if we were getting very technical, just one set of parameters defining its reflectivity, for example, whether it looks like metal or plastic.

We're only concerned with colour. So an object is made up of one or more surfaces and each surface can consist of one or more polygons. Each polygon will be described by three or more vertices.

Each vertex will belong to at least one more polygon, more likely two others, possibly more, so it's highly inefficient to record this information twice, or three, four or more times. Especially when designing the object it would be a nightmare if you decided that one vertex used by four different polygons had to be shifted slightly, and you had to locate and change four numbers.

This is clearly unacceptable. Instead, the list of vertices for the object is kept separately, and the polygons have pointers to the vertices they need to define their edges. Then you only need to change one vertex to move the point for any polygon that uses it.



● *Figure I: Different objects have different numbers of surfaces*

Size is not important

The vertices are points in three dimensions, so have x, y and z co-ordinate values. It's most convenient to define the vertices of an object relative to the object itself – separate from any other object.

So for a cube, you might decide that one corner is placed at the origin of the x, y and z axes, and all the other points are relative to it, as in Figure IIIa. Alternatively, you might decide the origin is in the centre of the cube and work from there, as in Figure IIIb, it actually doesn't matter.

The size is also irrelevant because when converting the vertices from the object's co-ordinate values to the *world* co-ordinate values, you can change the size as well as turn the object in any direction you wish. But that's getting a little ahead of ourselves.

Summing up so far we have defined objects, surfaces, polygons and vertices, but we still haven't actually got *things* yet. *Thing* is my technical term for an entire physical world object.

In a game like StarFighter 3000, for example, the oil-rigs are composed of several objects all linked together. There are the four legs, the main platform, the obelisk (which is also used elsewhere), and so on. But you can shoot just the leg and eventually the whole thing will ➤

blow up, or just the obelisk, or any other distinct part, and yet you can shoot *between* the legs of the rig and completely miss – a very nice feature that adds to the extreme playability of this particular game.

The authors achieved this by adding another two levels *above* the object in the hierarchy. Each part specifies the position and orientation of an object within the overall *thing*.

So you can have an oil-rig that has parts, for example four legs each of which is the same object but with a different relative position, although all of them are oriented vertically. It would be possible to get into the definition files of StarFighter 3000 and alter the orientation of one of the legs so it stuck out sideways.

Those with quick minds can no doubt see that from this method of describing the data it becomes easy to add information about whether the whole thing, or just a part, should rotate – like the entire space station, or just the radar dishes. Or potentially weirder effects, like a part changing into something else or simply distorting, a relatively easy effect to implement.

The *thing* can also have program code associated with it that describes its behaviour under different circumstances, for example an enemy spaceship can patrol or attack.

Figure IV summarises the final structure that we have for things.

More than one instance

So far we've looked at *things* in terms of their basic definitions, unrelated to the overall world picture. Continuing to use the oil-rigs as an example, we define just one of them in our basic data structure, but within the world we want more than one – the demo version of StarFighter 3000 has three of them.

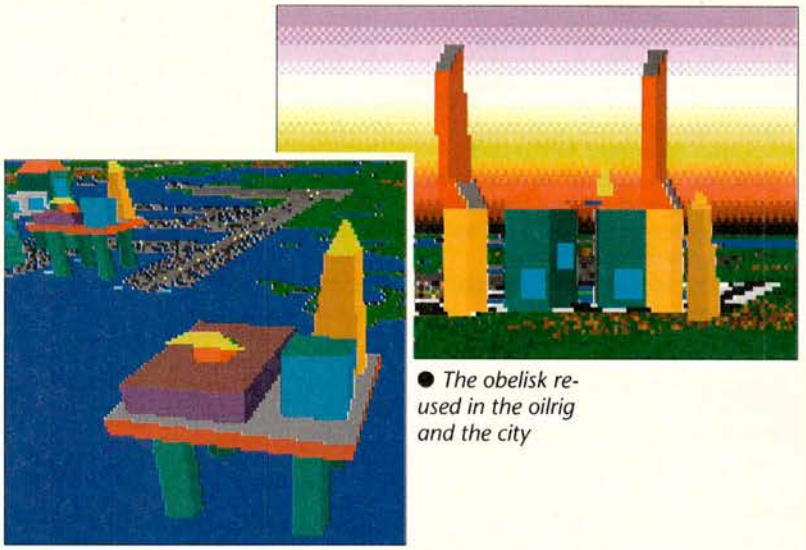
Do we define three separate oil-rigs, identical apart from location? Well we could, but it's inefficient and has drawbacks. For example, what about the situation where a missile base and enemy ships, when activated, fire missiles – they create new missiles. Although we might program the game we don't know how many missiles might be active at any one time.

Yes, we *could* put a limit in and define it in advance, but why bother? It requires *extra* programming to put in limitations and *extra* programming to check whether the limits are being exceeded and take action if they are.

No, we don't do that. Instead we use *instances*.

In our world definition we say that a particular *instance* of a thing will appear at a given location with a certain orientation. And we allow the system to dynamically add instances whenever it wants to – we can have as many missiles as the game wants to fire. It may slow the game down, but putting in limitations will *definitely* slow it down.

An instance defines the parameters in regard to the location of a thing within the world.



● *The obelisk re-used in the oilrig and the city*

Getting it to the screen

It may seem that we have a very complex structure here, and it is. But each part serves a purpose in either simplifying the processing or reducing the memory overheads.

The steps involved in getting instances of things in the world on to the computer screen may seem equally complex, but they are logical and involve programming legwork rather than innovation – remember it's all been done before, *lots* of times.

At each stage we want to cut out as much as possible from the scene that's being viewed. In other words, if something can't be seen we must try to remove it from the calculations as early as possible in the rendering process.

Due to space considerations and the fact that this is the last article I shall be able to write, I must avoid the maths and concentrate on the general principles. I apologise for this, it was not my original intention, but the end of the world has caught up with me.

In the most useful viewing system that we can use, we have a point *of* view and a point *to* view – the place where we're looking from and the direction we're looking in. This defines a central axis. Along this is what's called the *View Volume*, a fancy term for the space you can see.

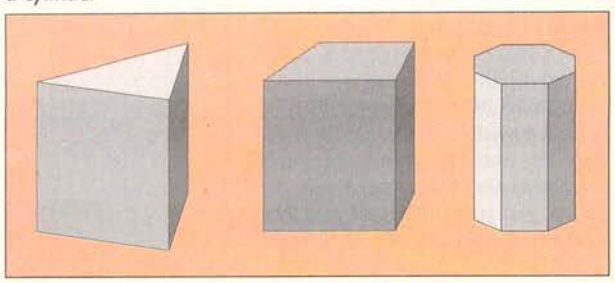
It's defined by a left and right side, a top and bottom, and (you'll love this), the *hither* and *yon* planes (near and far). This space can be imagined as a four-sided pyramid – with you at the pinnacle – that is chopped off before it reaches you. The chop-off point is the screen.

If an *instance* is outside this view volume, you can't see it. So the first thing to do is to make a list of all the instances of objects that are inside the volume. If you play StarFighter 3000 you'll have noticed the way that a thing will suddenly appear as you fly towards it. Well, this is the object entering the view volume across the *yon* plane.

The effect isn't noticeable with the left-right or top-bottom planes, as the things are off the screen anyway. However, you will notice a thing disappearing when you get too close to it, that's it crossing the *hither* plane.

An entire scene may have several hundred things in it, but this may well reduce to only a dozen or so

● *Figure II: Approximating a cylinder*



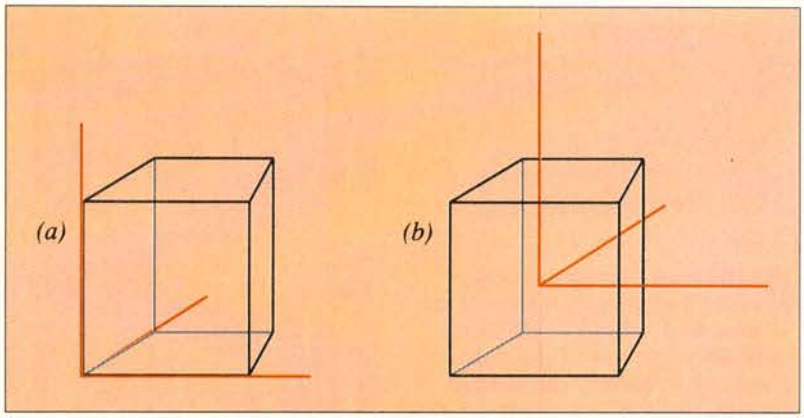
that are inside the view volume. But how do you check it? Each thing must have what's called a *bounding volume* – this is an imaginary shape that encloses the whole thing. It may be a sphere or it could be a cube or some other regular shape.

A sphere is actually the easiest shape to check, but it may well give a result that the instance is within the view volume when in fact it isn't. This is not necessarily a problem as bits of the instance will get eliminated later on. It's just a question of whether the time taken to check a more complex bounding volume is worth the effort, and for a game it probably isn't. What we can do, however, is mark in our data structure whether the instance is *definitely* or just *maybe* visible.

The bounding volume can also be used to check whether two objects have hit each other. You can check whether two spherical bounding volumes have intersected, and if they have, move on to a more detailed check to see if an actual collision has occurred.

We've got a little list

So now we have our list of instances that *might* be visible. From here we can break each possibly visible instance into its component parts.



● *Figure III: Positioning the origin of an object*

Each of these can have a bounding volume too, but we only have to check the ones that are *maybe* visible. After checking, we can throw away the *parts* that definitely aren't.

We then start to get into the nitty-gritty. Up to now we've been throwing out shapes based on whether they're in the view volume or calculated in the *world co-ordinate system*. Instances are defined in world co-ordinates so no conversion process is needed. However, the relative positions of its parts will be in *object co-ordinates*, so will need converting via matrix transformations.

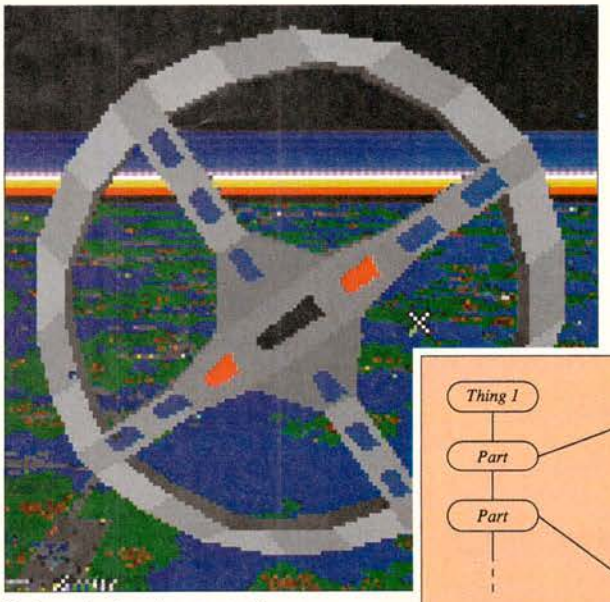
From there a list is created of all polygons that are potentially visible, although some may be hidden by others. All polygons should be defined so that the vertices are listed in a clockwise order if you are facing the polygon. It's then relatively easy to perform a check that tells you whether the polygon is facing towards or away from the viewpoint. Throw away all the ones facing away.

The remaining list of polygons and their vertices must be converted into *view co-ordinates* using the appropriate matrix transformations. From here you can use the scanline conversion algorithm described last month to draw the scene, and even have one polygon piercing another if you want.

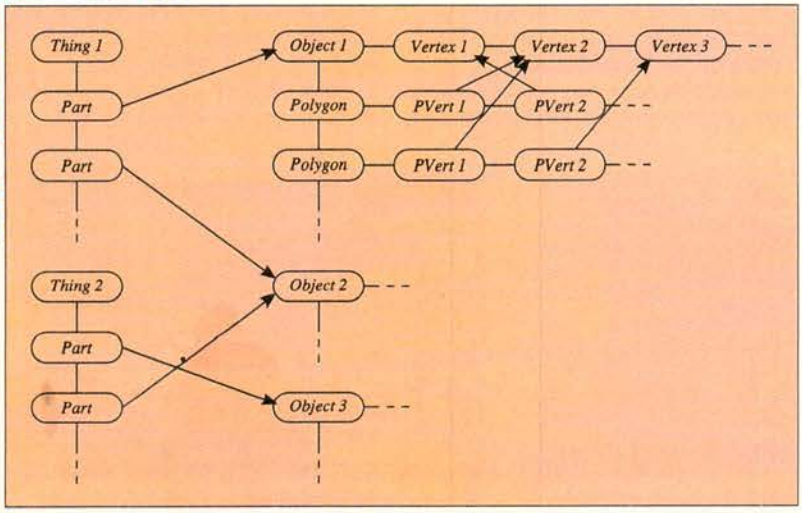
A word of advice

I had wanted to implement an entire 3D system but the magazine stopped before I did. Matrix maths can look daunting but there is no substitute for working through examples by hand. It may be long-winded, but if you get a good grasp of what you're doing it will make it much easier to program in the end.

Good luck.



● *Reoeated parts are used to create the space station*



● *Figure IV: The structure of things*

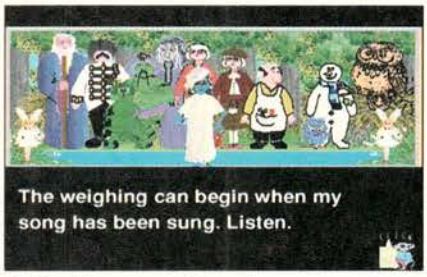
PRODUCT SPOTLIGHT

Product: The Revenge of Dragon Droom
Price: £30
Supplier: Resource, 51 High Street, Kegworth, Derbyshire DE74 2DA.
Tel: 01509 672222

Return of the Dragon

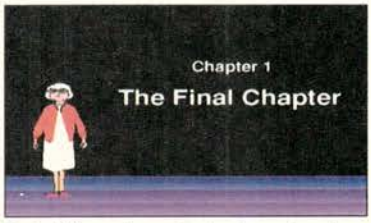
John Clemence looks at a classic education adventure with a new finish

OF the many problem solving/adventure programs that I have used with classes of children over the years, one of the most popular has been Dread Dragon Droom – for BBC B and Master 128 computers – from Resource. Now the story continues with The Revenge of Dragon Droom written specifically for the 32-bit machines, including a version for the Risc PC.



● *Nearly everyone from the story*

I decided to let my present class loose on the original software and then carry on with the new program. It has never crossed my mind to mothball the BBC computers (as I hear that some schools have), so this meant that I had three computers for children to explore the original program, and the one A3020 HD60 computer for the most successful adventurers to carry on with the new program.



● *A different way to begin a story!*

This is in two parts, each supplied on its own disk. The first part of the adventure contains chapters one to five. Chapter one is entitled The Final Chapter and after just three screens leads you back to the message *Press space or click to return to desktop*. This rather surprising and abrupt introduction soon turns back on you and asks if you don't feel ashamed of yourself. This all rather assumes that you have played the original adventure and is why I had my class work through that before they began work on *Revenge*.

However, The Revenge of Dragon Droom does not require you to have learnt anything from the original adventure, so you need have no real reservations about using it with children who have never seen the original. However, for those who have both games, it is worth noting that the problems in Revenge are more difficult than in the original, so you might consider using this resource over two year groups.

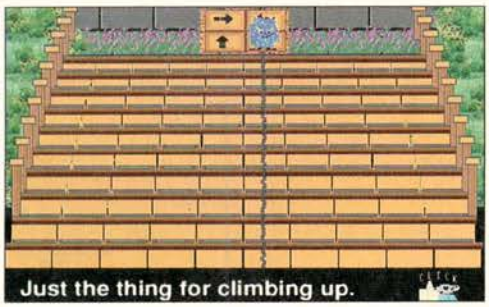
The final option from the choices page is to read *Grandma's Book*. I always think programmers are optimistic when they expect children (or adults!) to read information, especially when there are so many more inviting things to do and try when you are sitting at the computer, but my children had to learn the hard way that it was important to do this.

Some of the problems in the new program are quite hard. Indeed, there are some that I have not cracked at all although my class have, after a struggle.

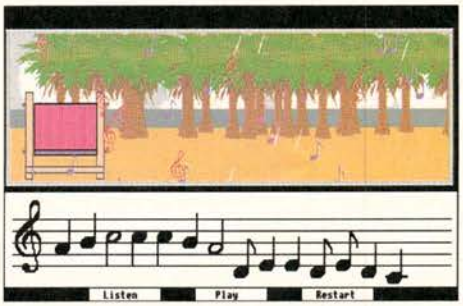
There are also some very clever ideas. In particular, one chapter has the children placing notes on a musical stave so that they get the computer to play back a tune that the computer plays to them. I thought this was an outstanding idea and was delighted to learn from Resource that a program of musical activities in which children can explore rhythm and pitch will be published later this year.

Summing up

The children really enjoyed both generations of Droom and repeatedly went back to the computers to retry many of the problems, even when they had already successfully completed them before. I think this says a lot both about the quality of the software and about how we, as teachers, tend to forget that children need and like to revisit previous successful experiences just as they love to read a favourite book over and over again.



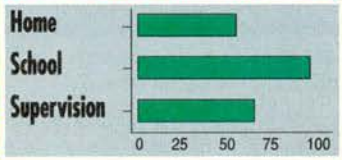
● *Find your way to the top of the magnetic steps*



● *A really clever seed for further development*

SUITABILITY

THE REVENGE OF DRAGON DROOM



NATIONAL CURRICULUM

KS2
Various

Ages 5-11

Getting your feet wet

Bringing the country into the youngest classroom. John Clemence reports

IF you are considering whether to take the plunge and install an Arc in an infant classroom, Pond could very well help you make up your mind. Written for very young children this is a suite of four simple counting programs. Each is based on the theme of the countryside, but two of the programs do feature a pond.

The software is supplied on a single disk and can be installed on a hard disk and works on any 2Mb Arc and on the Risc PC, even properly filling the screen of my AKF60 monitor, something which a lot of educational software does not yet manage. Any attempt to install the software on a second hard disk drive will bring up the message that the software has not been licensed for this machine, but still allows you to carry on and use it. It is worthwhile buying a site licence for use in schools. It just makes life much easier for the Information Technology Coordinator and you are always quite sure that you and your colleagues are working within the copyright rules.

PRODUCT SPOTLIGHT

Product: Pond
Price: £24.95
Supplier: Resource, 51 High Street, Kegworth, Derby DE74 2DA.
Tel: 01509 672222
Requirements: 2Mb

The first program is called *Teddy Bears* in the teacher's notes, but appears as Teddy Bear's Picnic on the screen. The children have to decide whether there is enough food on the blanket to feed all of the teddies. All they have to do is click on YES or NO. You can collect teddies along the bottom of the screen to show just how well the children are doing. You can also configure the program to remove teddies when mistakes are made. It is possible to set the number of goes from one to 13, the maximum and minimum number of teddies between one and nine, and it is also possible to set an option which means that all of the food offered is of the same type in each go.

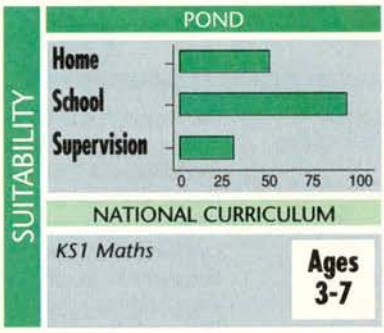
Little Ducks is a straightforward counting game. As with the teddies the minimum and maximum number of ducks can be set from one to nine and the number of goes from one to 13, and again, you can set an option to lose a duck from the bottom of the screen if the answer is wrong. You can also configure the speed that the duck swims across the screen, although there is no need for children to be worried by this since the ducks will happily bob about in the water until they have all been counted.

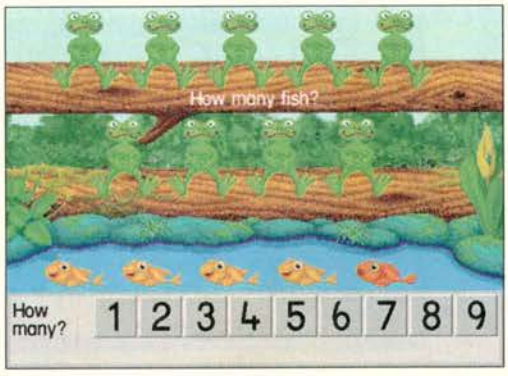
Butterflies is very similar to Little Ducks and the same options are available for setting how the program will behave. The butterflies flutter about in their own areas of the screen and are actually harder to count than the ducks. *Frogs* allows for a range of different activities including simple counting, more than, less than and more/less than. Although the program is called Frogs it is actually the fish that the children have to count. If they are trying to find *more than* they simply click over any number greater than the number of fish they can see, then that number of frogs jump off the log and into the water.

Summing up

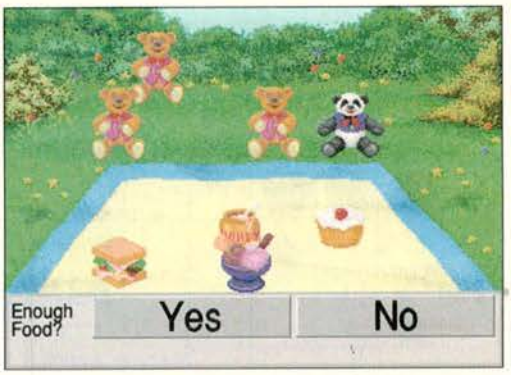
All of the programs have music and suitably countrified sound effects, all of which can be disabled if required. The graphics are delightful, especially on a good monitor, and the whole suite is simple to configure and use. This should certainly be on your shopping list.

● *Is there a quack in the house?*

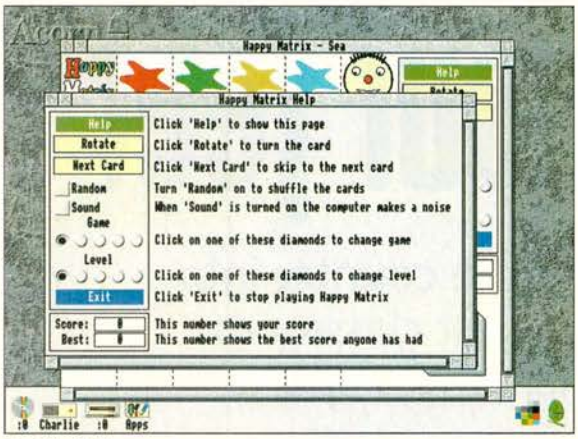




● *Anyone for a dip?*



● *Feed me!*


Happy Matrix - Sea
Happy Matrix Help
Help
Rotate
Next Card
Random
Sound
Game
Level
Exit
Click 'Help' to show this page
Click 'Rotate' to turn the card
Click 'Next Card' to skip to the next card
Turn 'Random' on to shuffle the cards
When 'Sound' is turned on the computer makes a noise
Click on one of these diamonds to change game
Click on one of these diamonds to change level
Click 'Exit' to stop playing Happy Matrix
Score:
Best:
This number shows your score
This number shows the best score anyone has had
Charlie
Apps

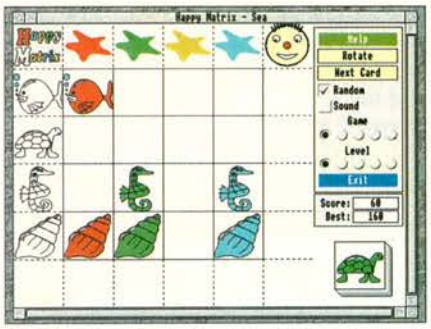
● *Help is kept to a minimum – but it is interactive*

Happy, happy

Jo Giles examines a new kind of educational game

I FIND that some children will do a great deal on screen which they seem totally incapable of at a desk and vice versa. Therefore, I have been looking for a game to encourage a group of children which they can use mostly on their own.

The Happy Matrix is an import which is available in DOS or RISC OS format and is pretty unique. As well as buying a set of computer games you also get a board (matrix) and sets of cards. The latter can be used on their own without going anywhere near a computer screen in your own games, or in mimicry of the ones on the computer.



● *Happy Sea at the easiest setting*

The computer version gives you five different games at five different levels, and the idea is to progress through each game and level. You can hop about if you wish to find the right stage of development for the child (or adult) using it. Instructions are kept to a minimum and the emphasis is on the visual.

Happy Sea is aimed at the youngest users (3-6 years), and works well with one or more players. The basic principle being developed and encouraged is colour recognition and matching. All the games are multi-tasking and run from floppy disk. At its simplest level you are just putting a fish, turtle, seahorse and shell into coloured rows as prompted by a card in the bottom right of the window. You do all the red colours, then green and so on.

Progress up the levels and the games become harder with the keys changing rotation until at the last level there are no key lines, just placed coloured sea animals. You have to logically put the right cards in the correct placing after making sure that the card is in the right rotation. In action it is simple, logical and fun.

If you or your child are now enamoured of sea animals, you can change the game, altering the cards to more unusual colours than the primary ones, and to more similar creatures in shape – starfish, octopus, crab and seal. You then move on to boats with increasing amounts of detail.

The levels remain the same, defaulting each time to level one as you change cards. The gameplay is fun and the progression smooth. I used the computer to teach the rules of play and then practised these on the board, but it worked equally well with two groups playing at the same time – one on the board and one on the computer.

Happy Life works with shape recognition, is aimed slightly higher (4-8 years), and features some excellently drawn characters. You start by matching tree tops to tree trunks, with some of the shapes of the trunks needing careful thought for younger players. This then moves on to butterflies and led to an interesting discussion about symmetry which was made easier with the actual cards. From here we moved to flowers and practice of counting and left and right recognition, as well as pure matching of colour and shape. The fruit characters and shape characters were a great hit too.

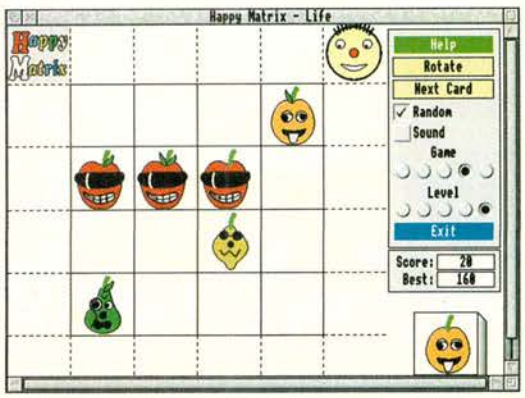
Happy Number is probably the most complex of the games, though apparently it's also aimed at children between the ages of four and eight. The process starts with counting and matching wheels to cars. This then moves on from matching the number of objects to the numeral, to matching balloon colours, orientation and number. By game four we are adding coloured dots to place a numeral in the matrix, and by game five we are on to pure numbers (though coloured to help).

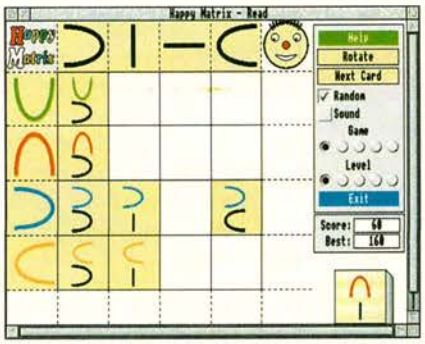
At level five this is more a test of logic and sequencing than addition,

PRODUCT SPOTLIGHT

Product: Happy Matrix (Happy Sea, Happy Life, Happy Number, Happy Time, Happy Reading)
Price: £29.74 each
Supplier: Creative Curriculum Software, 5 Clover Hill Road, Savile Park, Halifax HX1 2YG.
Tel: 01422 340524

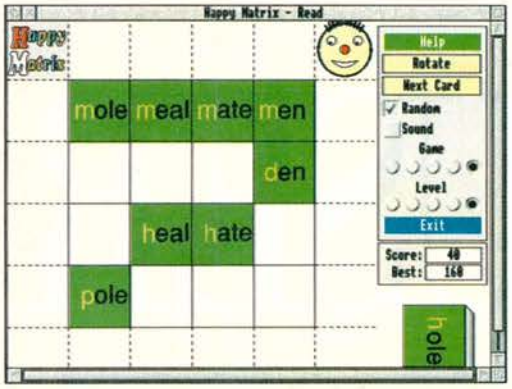
● *Happy Life at this level needs logic and matching skills*





● *Match loops and sticks to enhance reading skills*

happy, happy talk



● *Reading skills for the nine-year-old – don't forget to rotate*

● *Hone your addition skills on and off the computer*

as you always start with a 12 and a 6 – the colours tell you which row you are working on. (Do beware of not rotating the six to make a nine.) With the given numbers you can work out where the key numbers should be, and the matrix board and a pen and paper help. This is the most challenging of the games and one which saw the children needing the most assistance. It is also the game that the eldest testers wanted to play again and again.

Happy Time is aimed at 5-9 year-olds, but I found younger children quite at home with it as well. The game cards start with egg timers and act as a nice discussion point or just an introduction to the concept, it's up to you. Level two moves you to a mixed analogue and digital display, one key showing the hour hands and numeral, the other key showing the minutes.

Game four is unusual as it shows the concepts of time – night, morning, afternoon and sunset. This can be played as a pure matching game or as a discussion or story point. Game five adds to this with weather – rainbow, sunshine, rain and snow. The game board allowed us to use these cards as a weather chart as well as matching matrix.

I found an immediate use for *Happy Reading* with one child who mixes the curves on Ds, Cs and so on. The first game set requires the matching of the direction and colour of loops and sticks. Letters are not introduced until game two. Not everyone will appreciate the use of the font with a printed 'a' rather than the more usually taught 'a'. If you really object you can always replace the letter on the board game version. In game three we begin to construct words.

The game window allows you to opt for a random selection, sound effects – which are quite superb – and the ability to skip to the next card. At higher levels you will need to invoke the rotate button and a score is constantly updated at the bottom of the window.

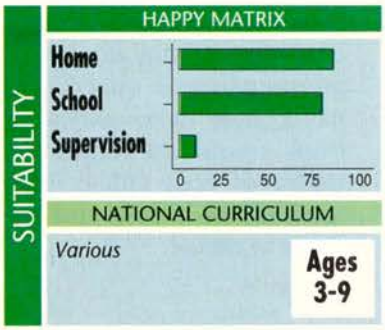
Help is interactive and you can have a group of children working on screen and at the desk alongside. How you want to use the software and board is totally up to you.

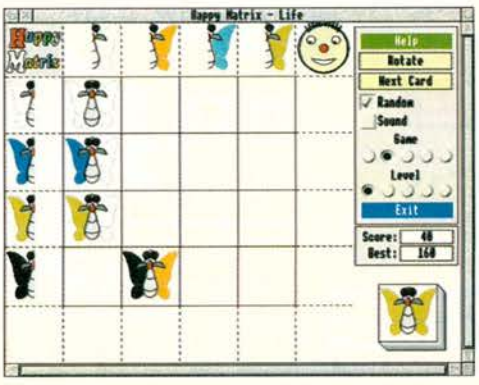
Summing up

The whole series is well made and manages to mix a constructed and managed learning approach with the ability to adapt and invent. Flexibility is built in if you want to access it – but it isn't compulsory.

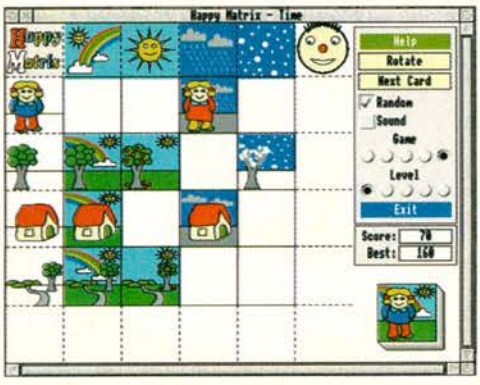
Happy Matrix fits best in the home where the games have a good lifespan. Basic matching skills in Happy Life can be mixed with the more complex higher levels of Happy Number, and they are excellent value for money. A superb series that is just as much fun to use for parents as it is for the children.

Jo Giles





● *Discussion of symmetry can be started here …*



● *… or here in Happy Time*

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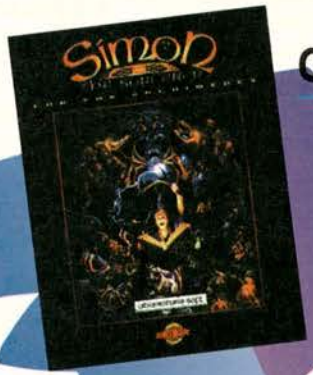

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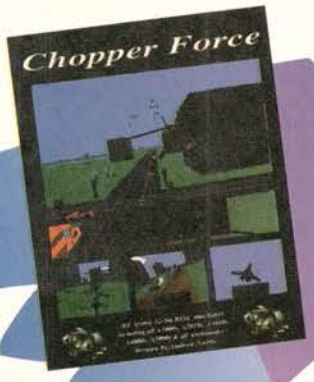

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* Not suitable for the Risc PC

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Strange

AGENDA

- Faulty wiring
- Body Building sound
- Midi problems
- Security
- Printer help
- A3010 expansion
- Monitor leads
- Basic help
- Printing
- BBC display
- What is an Acorn?

Q SINCE upgrading my A420 with a Watford Electronics ARM3, to RISC OS 3, it crashes occasionally – the mouse locks up and the machine has to be re-booted – but only when using a modem. I can stop it happening for a few days by pushing down on the RISC OS rom chips, but then it starts again.

We also have a Techno-I colour digitiser that we use with a different A420 with RISC OS 2. Do you know if it will work on a Risc PC? It seems to function correctly under RISC OS 3 – except when the windows are dragged off the screen. The software is version 1.01.

As well as outputting Mode 15 and 21 sprites directly, it also has a *multi-media* format that has a lot more colour information stored in filetype CBE. Unfortunately ChangeFSI doesn't know what this is, can you help?

Finally the digit 1 is worn out on the 10cpi daisy wheel of my Juki 6200 printer. Do you know of anywhere I might get a replacement? Nobody seems to do daisywheels anymore.

Simon Burnaud, Bicester, Oxon

A *It sounds like there is an address pin not making contact in the rom sockets. The fact that it only crashes when using flow control would suggest that it is only part of the rom that is not working – this points to an address line as well. However, I would be very surprised if the fault were only confined to that part of the operating system. I am sure something else is being affected as well.*

The solution would be to first try and isolate the faulty socket and then get it replaced. You can do it yourself but you have to be very careful, and without the necessary skill you can completely destroy the board. The hard part is getting the old socket out. The best way is to cut away or lift off the plastic leaving the individual pins standing up.

These can then be removed one at a time and the holes cleared with a solder sucker. However, it is a multi-layered board, and the power pins will therefore be harder to get out as the heat gets sucked into the earth planes. This requires a soldering iron with at least a 40W capacity, and a temperature-control so that it does not get too hot. If in any doubt get a professional to do it.

Unfortunately there is no way of telling whether something will work on the Risc PC until you try it. However, working under RISC OS 3 is a good start. It all depends on how the hardware was designed and software was written. Fortunately most cards I have come across work, and those that don't just need a software update.

This does not help if you can't get in touch with the manufacturers – Technomatic still exist though they are primarily PC suppliers. You are much better trying to phone in such a situation as it's more difficult to ignore a call than a letter. The CBE file type is not one I recognise nor could I find it in any of my reference material. It is possible that it is a proprietary standard.

As for your daisy wheel, there are still some places that sell them although your local computer museum might be the best bet. Again try and hunt down a supplier through searching the Yellow Pages or even Talking Pages.

Antique books

Q I HAVE a BBC Model B and I would be grateful if you could tell me where I could get a User Guide and a list of software available.

G. Mathieson, Sunbury-on-Thames, Middx

A *The BBC model B is getting very long in the tooth now and there is not much available for it, though some companies may still have old stock. However, I did notice the other month that Watford Electronics were still advertising manuals and some software for it.*

Mix and match

Q I HAVE recently acquired an Archimedes A3010 with RISC OS 2 but no monitor. A friend has offered me a Viglen Video Graphics Colour Monitor labelled *Mode No. CA 1428A* which has a 15-pin lead.

Is it possible to connect and use these two pieces of equipment?

R.J. Rawcliffe, Abergele, Clwyd

A *Assuming that your monitor has a standard 15-way socket, try making up a lead like this:*

15-way	***9-way***	
1	*1*	*Red signal*
2	*2*	*Green signal*
3	*3*	*Blue signal*
14	*4*	*Combined sync*
6	*6*	*Red return OV*
7	*7*	*Green return OV*
8	*8*	*Blue return OV*
10	*9*	*Sync return OV*

For best results the signal and return should be made with screened cable, with the return going to the braid.

Printer offline?

Q RECENTLY I bought an HP Laserjet 4L to go with my A5000, RISC OS 3.1. The user guide states that if a printer has an error it will report it on screen, for example: *Paper Out* or *Printer Offline*. But I have yet to encounter such an error, even when there isn't any paper in the printer – the hourglass just stays on until the problem is cleared.

The same happened when I used an HP Deskjet 500 and a Panasonic KX-P1123. The cable is the same one I used to use with my Atari ST. I thought the A5000 had a bi-directional printer port or is it simply the case that I've been using the wrong cable for three years? Can you help?

Jason Redmill, Carshalton, Surrey

A *It sounds like there are some wires missing off your parallel printer cable. Pin 12 is*

miscellany

labelled as paper error *so check that it has been made. If it hasn't it would not affect anything else in the printing process.*

However, it could just be that your printer uses this line to indicate a paper jam rather than a lack of paper. I can assure you that the A5000 has a bi-directional printer port but this has nothing to do with your problem, as when you use it with a printer you don't use the bi-directional capability.

PC or not PC

Q I AM interested in PC emulation on my A5000 and have version 1.81 of the PC emulator with a 20Mb partition on my hard disk. Unfortunately the only thing I can run at the moment is a very limited Careers database. I bought a couple of PC magazines to see if their cover disks worked, and installed the programs using the not-so-helpful menu screens. But, when I tried to run the programs, I got *Undefined opcode error – system halted.*

I realise there are later version of the emulator around, but I don't know where they are available or how much they cost. I need to know whether the careers database is the limit of the PC emulators capabilities or whether sound and graphics are possible without having to spend large amounts of money on a PC Card.

Matthew Walker, Retford, Notts

A *The PC emulator will only emulate the instruction set of a 286 microprocessor. Therefore any programs that use the extra instructions in the newer chips will not run on the emulator. The emulator only emulates the basic PC and that has little or no sound capability. You can't plug in PC hardware to your computer, so there is little point in buying a card.*

As for graphics there are a number of differing standards, but again the emulator only supports lowly CGA graphics – most magazine games require VGA nowadays. Therefore the emulator is limited to generally the older types of PC applications. Mind you, the newer stuff is nothing to write home about either.

Upgrade city

Q MY A3000 has been upgraded considerably and I'm running out of options. I have two printers, use both regularly, and I want to buy a sound sampler and a games pad both of which will have to plug into the printer port as well. Rather than keep plugging and unplugging I need an adaptor. What options are available and would it need some sort of buffer or power supply? I'm currently not using my serial port so what can I plug into that?

C. A. Egan, Birkenhead, Merseyside

A *You can get printer sharer switches which allow two computers to share one printer. There are also types that work the other way round. I have no details on these to hand but you can find them at computer suppliers that specialise in schools or office equipment – expect to pay about £50 for one. Serial ports can be used for a modem to connect up to the telephone line, or you can get printers with serial interfaces.*

Starting out

Q CAN you tell me how to make a HP 560 printer compatible with an A4000? Also, can you recommend a suitable and easy-to-read book on similar areas such as fitting a hard disk, upgrading A3000 and A3020s and so on.

Eugene Donnelly, Harlesden, London

A *To make your printer work you need the appropriate printer driver. Try installing the DeskJet+ printer driver from your RISC OS 3 system disks. Alternatively you could go for a commercial printer*

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Expand again

Q I HAVE had my A3010 for about six months and it has already been expanded to 4Mb of ram and I now need a hard disk. However, I need to keep my expansion socket free. What do you suggest?

I also want to take my other hobby – music – further. Could you suggest software and hardware that will let me connect equipment to the computer such as a compact disk player, record player, microphone, DAT, sequencer and so on.

I also want to sample about 15 seconds of these inputs and then be able to loop them, time stretch or alter the speed of them as well as create my own sounds using built-in instruments such as drum machines, pianos, keyboards and so on. Finally, I want to overlay all of these to produce whole records.

Jonathan Burt, Croft, Cheshire

A *You are asking quite a lot here especially as you want to keep your expansion socket free and you only have an A3010. I say* only *because you could have used products that are designed to plug into the computer where the econet board was designed to go, but these will not work with your machine.*

I think your only choice is to go for the multi-podule expansion system. This will give you a hard disk capability and up to three extra podule spaces. In these you can fit a Midi interface ideal for most of your music needs, a SCSI interface for controlling a CD player, and a sound sampler. These can be obtained from most distributors, many of whom advertise in the magazine.

However, I know of no interfaces that will allow you to control a record player nor any record players capable of being controlled. If you want to sample from records there is a CD Sampler program.

As for software, there are many sequencers on the market that will allow multi-track output to suitable Midi devices – try Clares and Computer Concepts. However, if you want your computer to produce any or all of these noises, then you will need a different sort of software and the results will be more limited.

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driver such as those from Computer Concepts.

Dabs Press have a number of books to help beginners. Try their RISC OS 3 First Steps. If you find the User Guide does not make any sense perhaps you are in need of personal help rather than a book. See if you can contact a local user group – the ARM Club are based in London – or a friendly Acorn dealer. It will amaze you what makes sense after those first few difficult words have been explained.

Where do we go from here?

Q I HAVE owned many computers from an Atari 2600 to a 486 PC. I am quite experienced with computers but don't know the first thing about Acorn. I am considering buying one but what would you recommend as the basic entry-level system, just as a 4Mb 486 PC would be for PCs? Also, which operating system should I go for?

What's the difference between the A3000, A3010 and A3020? Is the A3010 faster than a 386SX 25 with the same amount of memory? Does the A3000 series offer true multitasking, and does the Archimedes use the Atari joystick interface found on nearly all computers and consoles from the Amiga to the Megadrive?

I have a HP Deskjet 310 which I think is brilliant. Would I be able to use it with the Acorn machines and where would I get a lead and driver from? I have also got two 3.5in 100Mb IDE hard drives for my PC. Could I remove one and put it on the Archimedes and format it, or do I need a special adaptor? I have a limited amount of money and I am worried about memory. What type does the Archimedes use and could I use some SIMMS from my PC?

I will be using the Acorn primarily for graphics and DTP. Could you let me know the following:

- I am addicted to POV (Persistence of Vision) which is a PD raytracer on the PC and I have a front-end called PC3D which helps immensely. Is POV available for the Acorn, does it have a GUI and where can I get it from?
- Does the Archimedes have a morphing package called DMORF, or something like it?
- Is there a program that allows Archimedes files such as pictures to be transferred to and from the PC? What is the main graphics file format used by Arcs and what are the built-in programs like?

Last but not least, will I be able to use my colour VGA monitor?

Daniel MacDonald, Rochdale, Lancs

A *Your questions might sound simple but they are quite complex. Comparing two systems is not comparing like with like. However, I will try:*

The concept of any entry level system in the two markets is quite different. Most of the PC systems are in theory upgradable, though not without a lot of sweat and tears. The Acorn systems tend to be based on models that will do a specific job but can be upgraded using third party suppliers which tend to be a lot more reliable than the PC.

However, choosing a model will tie you in to some limitation unless you opt for the Risc PC. Having said that, you could look at the A3000 as a base system, but on a tight budget the original A3010 with some upgrades is remarkable value even today. You should only consider the RISC OS 3 operating system or higher.

The A3000 was introduced as a single box budget machine, whereas the A3010 uses more compact electronics to make things cheaper, and has the facility of being able to plug it into a domestic TV set rather than a monitor. However, of all the Acorn machines, it is perhaps the least upgradable.

Whether one computer is faster than another depends on a lot of factors such as the application running, the operating system and what you are trying to do. While the raw speed of the 386 may be faster – and that depends on how you measure it – the delivered speed (how fast it feels), is not necessarily faster.

You should be able to use your printer with the appropriate printer driver software, and Atari joysticks are supported via an interface or you can plug straight into an A3010.

I am not sure what you mean by true multitasking. It certainly provides co-operative multitasking. *That means the tasks co-operate in sharing, but if one task wants to be greedy and take all the time, there is nothing the operating system can do about it. This is the way most computer systems perform multitasking.*

You can't just swap disk drives. What you need is an IDE interface before you can do this. Also, some models might not have enough room inside the computer to fit the drive internally. Even then, certain types of low spec IDE drives won't work on Acorn machines.

The only Acorn machine to use SIMMS is the Risc PC. All other machines need memory upgrades tailored for the model. These tend to be much more expensive than the PC's, but in an Acorn machine your memory goes much further. For example, you can happily run most applications on an Acorn machine in 2Mb of memory

Vision on

Q A PROBLEM has recently developed on my good old faithful BBC B which is affecting screen displays. Mode 7 functions alright – as far as I can tell – apart from the cursor, which at switch on is three times its normal length, has a variable flash rate and disappears completely after a short time.

Control and Shift+function key strokes still work and produce Teletext control codes, colours and so on. Programs written for Mode 7 load and run with no problem.

The fun starts in Modes 0-6. Each mode defaults to a blue background and unreadable flashing of texts or numbers. In particular:

Modes 0, 1, 2 The screen comprises nine squares with the centre square being the active screen area.

Modes 3, 6 The screen appears full size and entirely made up of broad horizontal blue lines.

Modes 4, 5 Again full size with odd effects. Mode 4 sometimes changes into four small screens with flashing white/black backgrounds. Each screen is active for the text to appear in and the screens are separated by a broad black cross. Mode 5 screens take on the appearance of hundreds of small while flashing cursors in a sloping horizontal line pattern filling the entire screen.

Running a short text program to produce a red text background with colour 129 and yellow text with colour 2 actually produces a magenta background with flashing unreadable text.

I have removed the lid and rattled the wire and pushed the chips but the problem remains. However, I have found that the crystal case adjacent to VC1 and marked 17.7345 MITA-4B, is loose to the touch. I don't know if one of the lead wires has broken. Could this loose crystal case contribute to the faults?

My best best is either the 6845 CRT controller or Video ULA chip, or both components could be the root cause.

Mike Parr, Leigh, Lancashire

A *I should go with your best guess here and try replacing the Video ULA. All the symptoms you describe seem to come from a malfunction in that chip. The problems do not sound like the crystal as this would tend to either work or not – no half measures. If it's loose I would leave it alone at the moment rather than risk breaking it. As Mode 7 is working it is unlikely that the problem lies with the CRT controller.*

where a PC would not even allow you to run the operating system. Again you are not comparing like with like.

Acorn machines come with built-in paint and draw programs. They're free too. A version of POV is available and runs quite well, and there is also a design package. However, the GUI is not up to Acorn standard and it won't multitask.

There are commercial and shareware morphing programs. An application called ChangeFSI will allow you to read most graphic file formats and comes free with the Risc PC, and there's a shareware program, Creator, which allows you to make files which can be read by PC applications.

Finally, you can use your VGA monitor with the computer, but not all games will be able to cope with it. Some software, mainly games, switch the computer into a specific screen mode that is not compatible with the VGA standard. Most Acorn systems have either a standard monitor (domestic TV standard), or a multisync monitor for higher resolution modes.

Successful printing

Q I HAVE an A3000 (no hard disk), which I have recently upgraded to RISC OS 3 and added an extra megabyte of memory (now 2Mb). I have also purchased a HP 550C and a Turbo Driver from Computer Concepts. My word processor is First Word Plus.

My problem is that although the printer prints most characters, it will not print the £ sign. Nor will it print italics, sub- or super-script. These all printed without problems on my old Amstrad dot matrix.

Chris Connell, Runcorn, Cheshire

A *This is typical of a lot of printer problems that are cropping up nowadays, and unless I have the very same word processor, printer and printer driver, I can't produce a definitive answer. However, if you understand the principles involved there is no reason why you can't come up with an answer, if not a solution.*

There are two ways a printer can produce letters, by character code or by graphics. Now when you send characters to a printer, it puts down on paper the pattern associated with that particular character code. This is fine for the majority of characters, but country-specific ones – like the £ – can prove difficult.

If the printer has the dot pattern for a £ it is the printer driver's job to intercept the character code the word processor produces and substitute the code that the printer needs. Sometimes the substitution can be performed by the printer setting the internal switches which normally would allow the substitution of # for £, but not all printers can do this.

Likewise with the italics, sub- and super-script, dot matrix printers tended to accept a single code and then produce all subsequent characters in the appropriate style. However, if your new printer does not operate like this then there is little the printer driver can do with single character substitution.

The other way a printer can produce characters is by using graphics, ie the printer is simply told where to print every dot. Therefore the printer doesn't need to know how to print any character and so can produce anything, including pictures. The disadvantage of this is that the word processor or printer driver has to know how to form every character in every font and style, and sending text to the printer involves a lot more than data transfer.

This is the idea behind Apple's True Type and Acorn's Outline fonts. Postscript – the major description language – is similar, but can be implemented in a number of different ways. For example, you can pass to the printer the dots needed to write the character. Alternatively you can pass the printer character codes, and the printer has to have the appropriate font built-in or downloaded.

Now returning to your particular problem. As I said, there are three elements to it: Printer, word processor and driver. You will find that if you contact the supplier of one they will try to blame either of the other two or even Acorn, who really has nothing to do with it.

However, in this case, it is clear that the problem is in the word processor. First Word Plus is archaic and doesn't use the RISC OS printer drivers properly – it uses the first technique I described. Your best bet is to change that to a modern one, such as Impression Style (Computer Concepts) or EasiWriter (Icon Technology).

More printer problems

Q A FRIEND has a 1Mb A3010 connected to a Canon BJ10-ex printer. Until recently the printer worked fine, printing out documents in Pendown. The printer port is connected to the printer correctly, but now nothing will print.

The printer responds to the startup commands from the computer but try to print and nothing happens. Is this something to do with the printer buggers? Also I tried a VDU2 command in Basic but yet again the printer didn't respond.

Mark Tukrell, Tarporley, Cheshire

A *What is wrong here is that it's broken. Well let's see if we can track down what has gone wrong. As the printer/software combination used to work and now it doesn't, you have developed a hardware fault assuming that you have not corrupted the software driver.*

However, the fault could be anywhere in the chain. What you have to do is eliminate the working components. The first step is to try another printer on you computer, this will clear your computer of the blame. Then try the printer on another computer with a different computer lead. If you don't have these things available then take the printer back to whoever sold it you and get them to check it out.

8-bit know-how

Q A FEW months ago I was given a BBC Master 128 with a few Welcome disks. These worked for about three weeks but then I could only get the catalogue as everything else came up as a disk error or not found. It has a built-in word processor which works, but we can't print because the GRANTI disk won't work.

Could these disks be corrupted, they must be at least 10 years old?

Margaret Colver, Aylesbury, Bucks

A *Now when you were give the computer you should have read the manual that will have told you to make a backup of the disks. It is likely that you have done something to damage them, this is particularly true if you are new to computing. For example, you might have touched the magnetic surface – grease from your finger can stop it from working. You might have subjected the disks to a high magnetic field by putting them next to a loudspeaker or motor.*

*Alternatively the drives might just be playing up. Try inserting the disk but not closing the latch. Then ask for a catalogue – by typing *. – and while the disk is spinning, close the latch slowly. This sometimes centres the disk more accurately.*

It is unlikely that you can purchase the Welcome disks so long after the computer has stopped being manufactured. However, all is not lost as there are many of these machines in schools and colleges and your best bet is to contact a local one and ask if they can provide you with a copy.

Alternatively, your local Acorn dealer might be in touch with a user group or some individual who could let you have a copy of these vital disks. You can find out who your local dealer is by contacting Acorn directly on 01223 254254.

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The final curtain

Mike Cook hangs up his soldering iron

LAST month I promised this was going to be a very special Body Build article, and so it is, as it is the last one. As you have seen from the rest of the magazine this is the final issue and so I thought I'd take a look at the whole Body Build series and share with you some of my favourite projects and some of those that never made it.

As you may know, I have had something printed in all 147 issues of the magazine since the first in March 1983 – that's just over 12 years of meeting a monthly deadline. My Body Build articles have been in all but half a dozen issues, and those that were missed were due to last minute exclusions by the editor due to shortage of space, mainly under the editorship of Pete Davidson. If you look at the list of all the articles you might see that the numbering has gone awry with number 117. I originally wrote this as one article, but the editor split it up into two, and still failed to print the circuit figure in either.

The whole thing started with Mike Bibby giving me a call in November '82 and saying one of my ex-students had told him I might be able to write an article on upgrading a BBC Model A to a Model B. A meeting was arranged where he told me about the idea to publish a magazine devoted entirely to Acorn's BBC microcomputer. I said I would like to write a series of articles and we agreed that I would produce four for him. Secretly I thought the magazine would only go for two issues, which shows you my credentials in the infallibility stakes.

Over the Christmas holiday that year Mike came round to my house to collect the manuscript of my first article, a service you don't get from editors nowadays. Mike was very impressed with the fact that my work was typed, well, dot-matrixed. In fact it turned out that my work was the only one in the whole of that first issue to be word processed by computer, everything else was hand-written. Even the program listings had to be re-entered into the typesetting system by hand. An early source of horror was the typesetter saying *I corrected that obvious mistake in your program.* Nowadays, the words go straight onto the DTP page and don't see paper until the final proof.

I have always used a word processor because I am dyslexic, but at school this was known as being thick. The first computers did not come with spell-checkers and so I had to marry one. Incidentally, I have never written an article using an Acorn computer – the first articles were written using a TRS-80, much customised, and for the last 10 years I have used three different models of Apple Macintosh.

The thing I didn't like about word processors on the Acorn machines was the (original) relationship of the block cursor to the text insertion point. This was a product of the operating system and so most software writers accepted it and didn't implement a proper I-bar cursor. Also, the graphics capabilities made the Macintosh better for the diagrams I needed to produce, and for laying out printed circuits. However, if I were starting out from scratch now there are Acorn products available that are just as good.

Looking through the list of articles you will see I have covered quite a large range of topics. One of the best things about this has been the feedback I have had from readers at shows, where I am frequently asked where I get my ideas from. When the late Peter Sellers was asked where he got his ideas from he always replied *A small tobacconist just outside Bradford.* However, in truth, there are many sources of inspiration. Note here that you are always inspired – you never plagiarise.

Most projects have been things I wanted to do, because I wanted to see how they would work. However, on occasions, the three editors I have worked with have put in their requests. The first of these was Mike Bibby wanting me to make an acoustic-coupled modem. I told him they needed type approval from Telecom, but he told me I was wrong as there was no electrical connection with the phone system.

After the article was published it was proved that I was right all along – it's a good job I had put a Not Approved symbol and text on the printed circuit board. In those days I used to design the printed circuit boards and the magazine would gather the parts together and sell the kits. Later I was to take over the whole process through my Musbury Consultants business.

Peter Davidson, my second editor, mithered me for quite some time to produce a multi-purpose educational interface board. I finally succumbed to this pressure one month when I was really quite short of time, so I could write a quick article about the overall plan of the project without having to make anything. In subsequent months I looked at most forms of interfacing using this board. It was adopted by a few colleges as part of their electronics courses.

Steve Turnbull has been much less demanding in having his projects done, but he must be thanked for providing the inspiration for what must be my favourite project, the nose trimmer. He was planning a 3D issue with free red-green glasses on the front cover along with some software on the cover disk and articles on 3D.

I said I would try to come up with a tie-in article and eventually decided on the twin-rotating shutters that allowed you to see full colour 3D images on the computer screen with only a 50 per cent chance of getting your sniffer shortened! In the end the other articles never made it and so mine did not tie-up with anything. What drove me to produce this was that I just had to see what it would look like.

I must say that this proved to be much better than I'd imagined. Most people seeing it at shows over the last two years have agreed with

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me. While anyone with a full set of past issues can look up the projects I have covered, what you don't see are the projects that never made it. You see, the way I work is that I have a number of ideas on the go at any one time. When the monthly deadline looms I take one and mature it to a finished article. Therefore there were a number of projects that never left the planning stage, some that were discarded because I couldn't get them to work well enough, and some fell by the wayside as technology advanced.

A good example of this was my BBC Micro graphics enhancement system. The idea was very simple – in graphics mode 0 there was lots of resolution but only two colours. Therefore by replicating the video circuit another two times you could have mode 2 colours with mode 0 resolution. This could be done simply by having another set of ram chips and ULA video controllers wired with most of the same signals as the originals. Diagrams were drawn and chips were ordered but somehow I never got round to making it.

The same thing happened when the A310 was launched. I was very disappointed at the lack of an 8-bit palette so I designed a card that would add one and allow all 256 colours to be programmed independently. I got so far as to actually make a prototype of this and I showed it at a talk I gave to Wakefield Computer Society. It took the original video signal from the RGB socket and re-digitised it. Then it was applied to a BT478 chip which contained a full 8-bit palette and three high speed D/As. In order not to affect normal operation I used a video selector chip to switch the original output through to the new socket.

This never made it for a combination of reasons. First of all the video switches introduced too much distortion for my liking and it was tricky incorporating the new commands into the operating system. Also it was announced at the same time that Computer Concepts had just made a similar device and it would be launched soon. So I concluded that the potential market would be such that it would not be worth the effort of finishing it. As it turned out I was wrong again as it was over 12 months later that the Computer Concepts board was available, and it used a totally different principle to obtain a similar effect.

I never got round to using the Texas Instruments graphics chip with hardware sprites, nor the speech recognition chips from a company that no longer exists. The

Articles ... Articles ... Articles ... Articles ... Articles ... Articles ... Articles ... Articles ... Articl

BB	1	March	83	Upgrade a model A to a B, part 1
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BB	33	December	85	Multiplexed Input/Output, 32 inputs and 32 outputs funnelled through the user port.
BB	34	January	86	Sound Sampler Part 1 the hardware + Stutter software.
BB	35	February	86	Sound Sampler Part 2 Real time effects software.
BB	36	March	86	Sound Sampler Part 3 Sampled sound playback software.
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BB	38	June	86	All about non contact switches.
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BB	57	April	88	Star tracking using a protractor.
BB	58	May	88	Rain Gauge Part 1.
BB	59	July	88	Rain Gauge Part 2. (Tipping gauge + electronics)
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BB	61	September	88	Experimenters board. Part 2. The Hardware.
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BB	67	March	89	Experimenters board. Part 8. DC motor control, speed.
BB	68	April	89	Experimenters board. Part 9. Audio waveform synthesiser.
BB	69	May	89	Experimenters board. Part 10. Natural sound generator.
BB	70	June	89	Use mercury switches to turn body movement into computer control.

chips lie dormant in my component store. In similar vein I also never got round to making a SCSI interface for the Model B nor attaching a I²C interface to it. Also, the real-time video digitiser that I built within a week of getting my A310 was made to work, but not well enough.

The idea was to use a FIFO (First In First Out) memory to feed the samples directly into the computer rather than through some intermediate memory store as used on other units. The advantages would have been the low cost and real-time full motion video capability. In practice I couldn't get rid of a black line down the edge of the image, and because of the speed of the A310, it would only work with a 128 x 128 image.

From all this you might think that nothing worked, but the articles actually published show this was not the case. However, not all the published articles have been a great success. Perhaps the least successful was the 40/80 track drive switcher. This was at a time when there were no switchable disk drives around so you either got a 40 track one or an 80 track one.

This project intercepted the head movement pulses and added an extra pulse to double-step the disk drive, thus enabling the 80 track drives to read 40 track drives. It was successful in that it worked and worked very well. However, I got 100 printed circuit boards made and only sold three. In fact, a few articles cost me more in buying chips and other hardware than I got for writing them.

Many people at shows have told me that they have read all my articles but haven't made any of them. Let me assure you that I have made all of them but not without cost. At the height of the sales of assembled projects, in those far-off days before the recession, I would often spend whole days behind a soldering iron. Now it appears I have developed a form of late-onset asthma that is particularly aggravated by solder flux, so now I have to limit my use of the soldering iron and try to avoid the fumes. My use of a steroid spray means I can't cough for my country at any of the international coughing events like the Proms.

Anyway, as you can see, the magazines have run out before I have run out of ideas – not bad for a four-part series. All I can say is thank you very much for reading them. If you have had half as much fun reading them as I have had writing them, then I have had twice as much fun as you. So, I will hang up my soldering iron and say goodbye – but, to coin a phrase, I'll be back.

Articles ... Articles ... Articles ... Articles ... Articles ... Articles ... Articles ... Articles

BB 71	July	89	Magic Wand Use LEDs to wave words out of thin air.
BB 72	August	89	Cooling Fan Solve your overheating problems.
BB 73	September	89	Using a Maplin temperature monitor.
BB 74	October	89	Extra I/O on the User Port using the serial shift register.
BB 75	November	89	Whistle control. One man and his dog game.
BB 76	December	89	Experimenters board. Part 11. Making an A/D converter.
BB 77	January	90	Chameleon Colour paillette part 1. Hardware.
BB 78	February	90	Chameleon Colour paillette part 2. Software.
BB 79	March	90	LED matrix display, useful for a possum control.
BB 80	April	90	LEDs to monitor your disk drive.
BB 81	May	90	Use IBM PC monitors on your computer using a Sync Separator
BB 82	June	90	Attaching a Joystick to the Archimedes.
BB 83	July	90	Attaching external keys to the computer.
BB 84	August	90	Proportional mains power control control.
BB 85	September	90	How to drive the User Port from Logo.
BB 86	October	90	Connect your computer to a TV set using its SCART plug.
BB 87	November	90	Hall Effect Sensors to detect magnetism.
BB 88	December	90	Use light dependent resistors to generate ever changing art work.
BB 89	January	91	Power Supply for your Disk Drive.
BB 90	February	91	A Serial User Port for computers without ports.
BB 91	March	91	Protection board for the analogue input port.
BB 92	April	91	Motor Control Using a push pull IC driver chip.
BB 93	May	91	I²C Bus, ways of taping the hidden bus on the RISC machines.
BB 94	June	91	I²C Bus analogue and digital interface board.
BB 95	July	91	Using the I²C boards A/D and D/A converters.
BB 96	August	91	Using the I²C board to make a transistor curve tracer.
BB 97	September	91	Using the I²C board to trace capacitor waveforms.
BB 98	October	91	Using the I²C board for a Brain surgeon game.
BB 99	November	91	Using the serial User Port for temperature monitoring.
BB 100	December	91	Sound sampler hardware for all Acorn Machines.
BB 101	January	92	Sound Sampler software for 8 bit machines.
BB 102	February	92	Sound Sampler software for 32 bit machines.
BB 103	March	92	An oscilloscope using the Sound Sampler hardware.
BB 104	April	92	Real time Echo chamber and sound manipulator.
BB 105	May	92	Computer Seismometer
BB 106	June	92	Infer red remote control of your TV and VCR.
BB 107	July	92	Using the Body Build Video Digitiser with 32 bit machines.
BB 108	August	92	Anamorphic art using a polished Coke tin.
BB 109	September	92	Arc Mouse alternatives, track ball and twin control.
BB 110	October	92	Sneak thief, get the treasure past the infer red beam.
BB 111	November	92	Shoot the Desk Duck with a SAGA light phaser.
BB 112	December	92	Interface Lego's light brick and other parts to your computer.
BB 113	January	93	Inspect a Morse, decode and display Morse code.
BB 114	February	93	Add a band pass filter to the Morse decoder.
BB 115	March	93	Contact less switch. Operate your computer from behind glass.
BB 116	April	93	Piezo electric cable. Make a punch strength meter.
BB 117	May	93	Twin Peeps part 1. View stereoscopic 3D images through rotating shutters.
BB 117a	June	93	Twin Peeps part 2, the software.
BB 118	July	93	A new look at stepping motors.
BB 119	August	93	Experiments with a Liner CCD sensor chip.
BB 120	September	93	Anti theft devices.
BB 121	October	93	Computer Guided Telescope (CGT) Part 1, the overall system.
BB 122	November	93	CGT part 2, sensing the telescopes movement.
BB 123	December	93	CGT part 3, serial communications with the computer.
BB 124	Special	93	Computer-controlled xylophone.
BB 125	January	94	CGT part 4, the display.
BB 126	February	94	CGT part 5, the software.
BB 127	March	94	The bidirectional printer port explained.
BB 128	April	94	Summer fair attractions, roller ball race game.
BB 129	May	94	Monitoring the movements of animals.
BB 130	June	94	Sauce bottle simulator game.
BB 131	July	94	Automatically counting coins.
BB 132	August	94	Chaos from a dripping tap.
BB 133	September	94	How to drive servo motors.
BB 134	October	94	Monitoring solar magnetic storms by measuring the Earth's magnetic field.
BB 135	November	94	Ultrasonic movement detector.
BB 136	December	94	IR measurement of temperature.
BB 137	Special	94	A touch screen system.
BB 138	January	95	Tug of war game with mercury switches.
BB 139	February	95	A music keyboard interface.
BB 140	March	95	A round up of all articles.

Netiquette

Minding your P's and Q's on the Net – John Allen points the way

BEFORE taking part in Internet Usenet discussions you should know a little *netiquette*.

Netiquette is really politeness and common sense for the Internet. Follow the rules and you will learn a lot and have some fun. Step over the line and you are likely to get *flamed* or *mail-bombed*, in other words be subject to public ridicule or a mail box full of critical messages.

Style – six rules of thumb

- Remember that groups are read all over the world, so messages should be clear and easy to understand. Some readers may be children – so no swearing.
- When first joining a group find out if there is a FAQ – Frequently Asked Questions – file and read it to avoid wasting other people's time and being classed as a *newbie*.
- Do not post long uu-encoded files in the normal discussion newsgroups, post them in one of the special *binaries* groups and send a message to the discussion group telling everyone where they can find the file. Many people have to pay to download their messages and can't pick and choose beforehand. They will not appreciate seeing pictures of you on the beach in Blackpool.
- Keep your signature – the few lines added to the bottom of each message – small. Two or three lines should be enough, any more and you are wasting computer resources as your message is spread around the world.
- Do not write entire messages in block capitals, they are tiring to read and are the e-mail equivalent of shouting.
- When following up a thread, do not quote too much of the previous message. A good rule of thumb is to write more than you quote.

Discussion

Make sure that your messages are posted to the appropriate newsgroup. A message about Star Trek in the *alt.tv.prisoner* group will result in a flaming.

Also try to put something into a group as well as getting information out. To take an example: I work in the radio industry and take part in *alt.radio.uk*. Someone might ask the group how to set up a temporary radio licence and they would be sure to get a useful thread of discussion underway.

There would be a less favourable response if their message reads *please e-mail me direct as I do not read this group*. It is the difference between a chat with mates in the pub and professional consultancy. The chat comes for free, I charge a fee for consultancy.

When starting a new thread make sure that the subject is suitably descriptive so that people who are not interested will know to skip the message. If the discussion within a thread goes away from the original topic, rename it, for example *Character Input (was Reading Files)*.

Advertisements

It is generally accepted that newsgroups are not to be used for overt commercial purposes, so do not post blatant advertisements, a sin known as *spamming*. Spammers can expect to be mail-bombed as many people respond by sending a copy of the message back to the sender's e-mail address with a comment of *I am not interested*. Or worse, the advert posted back dozens of times.

It's a great way to get thousands of e-mail messages, but a complete waste of time and your money if you have to download it.

Advertising should be done with subtlety. For example, a software author could offer support to users rather than directly advertising their wares – readers will come to know the product through the help given. Ultimately this approach is likely to get more orders.

Know the netiquette rules and you will get a lot out of the newsgroups. They are many people's favourite use of the Internet, and in time you can make many friends by using them.

Common abbreviations

Some abbreviations crop up regularly in newsgroups. Often the context helps you to work out what they mean, but here are some of the most common:

AFAICR	As Far As I Can Recall
AFAIK	As Far As I Know
BTW	By The Way
FWIW	For What It's Worth
IMHO	In My Humble Opinion
ISTR	I Seem To Remember
ROFL	Rolling On Floor Laughing
RTFM	Read The Friendly(?) Manual

Newsgroups

Newsgroups are a collection of messages on a specific topic. For example *comp.sys.acorn.games* is about games on Acorn machines. Subscribers to a group can read all of the messages in sub-topics, known as threads. For example there might be a thread on Simon the Sorcerer in comp.sys.acorn.games. Users can then add their comments and post their own message, or start a completely new thread.

Smileys

As Usenet messages are written, the emotion behind the words is not always clear, so *smileys* have evolved to allow writers to make it clear when the words should not necessarily be taken at face value. They should be used sparingly, here are the most common ones:

```
:-)     The basic smiley, suggests a sarcastic or jokey statement
;-)     Winky smiley, a flirtatious or sarcastic remark
:-(     Frowning smiley, the writer is depressed or upset
:-|     Indifferent smiley, between :-) and :-(
;->     Biting smiley, a biting or really sarcastic remark
>:->    Devilish smiley, user has just made a devilish remark
```

Lighting up the sky

John Allen explores the possibilities of application integration

FIREWORKZ is now complete as Recordz – the database application – has now appeared to join Wordz and Resultz which supplied the wordprocessing and spreadsheet elements. Each application is available separately, but together they form Fireworkz Pro. There are file-compatible versions for both RISC OS and for Windows, which is handy for schools with a mixture of machines. I tested an early RISC OS version.

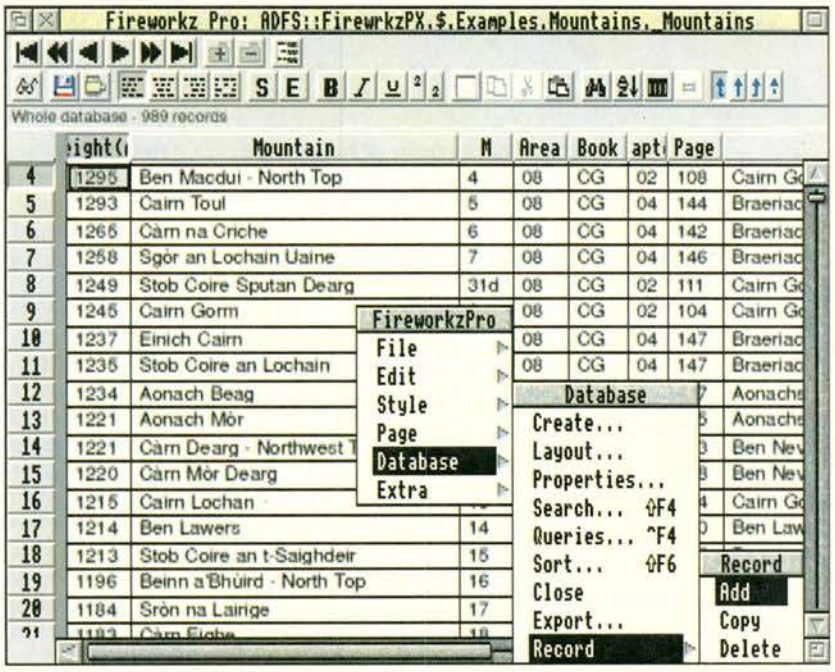
Recordz is a straightforward no frills database. It is quick and easy to create a database and suitable for most everyday uses. At its heart is Iota's Datapower engine, giving complete file compatibility with that product.

Recordz databases can be displayed in either a card or spreadsheet layout. Neither display is as neat as the card layout of, for example, Squirrel or Datapower, but both are practical and will be familiar to users of its 8-bit ancestor, Viewstore.

Database templates are provided for both types of display. Data is shown on screen as if it is stored in spreadsheet cells with a row for every record and either one column containing all of the fields for the card display, or a column per field for the sheet layout.

Setting up a database is a simple step by step process:

- Open a document with the appropriate template and save the empty file
- Define the fields using the Create Database dialogue box
- Specify any special properties of the field with the Properties dialogue box
- Create a record by clicking on the + icon or selecting *Add Record* from the menu
- Enter data into the new record
- Continue to use the add or copy record options and enter the data for the remaining records.



It is possible to alter the structure of the database after it is in use, adding or removing fields, changing the layout and choosing not to display all of the fields.

Searches – defining a subset of the records in a database – can be based on one or all of the fields. Once performed, a search is added to the active queries list, making it possible to switch between different subsets of data or to refine a search later. This is a neat idea.

Records can be sorted into ascending or descending order based on one or a number of fields and it is possible to specify the order of priority of the fields.

The big plus of using Recordz in its Fireworkz Pro form is integration with Wordz and Resultz. This means that although Recordz has very little in the way of a report generator, Wordz and Resultz can easily be used for the purpose. Resultz functions can be used on database fields but they apply to every record. Functions can be used within fields, but as Recordz uses the Datapower engine, these are Datapower functions not Resultz ones.

PRODUCT SPOTLIGHT

Product: Recordz
Price: £99
Product: Fireworkz Pro
Price: £149
Supplier: Colton Software, 2 Signet Court, Swanns Rd, Cambridge CB5 8LA.
Tel: 01223 311881

New featurez

As well as the database, Fireworkz Pro contains some new features:

- Numbers can be edited directly in a cell by placing the caret in the cell and editing as with text. This is far faster than the previous method using the formula line
- The button bar has been rearranged and extended. The buttons displayed depend to some extent on the cell containing the caret. For example, database buttons if the caret is in a database cell, spreadsheet buttons when working with a spreadsheet
- Fireworkz Pro uses implied styles to distinguish between text and number cells, so it is not necessary to apply text style to text areas of spreadsheets
- Styles can be used inside number formats to define different formats for positive, zero and negative values
- Some common styles of input are recognised. For example, £6.25 is now recognised as a number prefixed with £, rather than text
- Fireworkz Pro can load Microsoft Excel files in version 2, 3 or 4.0 format.

Summing up

Fireworkz Pro is a worthy successor to PipeDream, the original version of which even predates RISC OS. The Recordz part has a very flexible search and select system, but it does not have the facilities of a top-flight database – it's not relational and it's not possible to do calculations within fields using external variables, such as may be necessary with VAT.

Bob and Trev — the final encounter

The end of life as we know it...

TREV sat in front of his PC – he never was into *proper* computing – staring at the strange message that had appeared on his screen.

From: bob@romchester.rogues.co.uk

To: trev@pc-anonymous.leiderhosen.co.uk

Dear Trev,

It's been a long time, hasn't it? What have you been up to? I thought I'd just send you a quick message and see how you were getting on. I thought we could meet for a drink, as I have an important announcement to make. Remember the pub I used to drink in? I'll be there a week on Saturday evening, about 8pm. You'll recognise me.

Bob.

PS. Mike Cook isn't coming.

Trev took a deep breath. He hadn't seen Bob for four years, but had had lots of letters from him. And who was this Mike Cook he kept on talking about?

He switched off the machine, plonked himself in front of the telly with a can of Boddards, and flicked over to see Guinevere choosing her balls.

Looking down at the ticket, he noticed he'd become a winner! "It can't be me", he thought to himself, but then the reality came to light. Of course, it wasn't going to change his life. Oh no. After all, £10 would hardly stretch to a copy of *Nut Abuser* nowadays. In the good old days it would have bought a subscription to *Electron Users' Anonymous* – if it had run to two issues.

The Ram and Buffer was quite full for a Saturday evening. It was a shame the subsidence problem had finally forced a condemnation notice upon the place.

It had come to iight that the pub had been built on top of a landfill site where Acron had dumped all the unsold Electrons, and both the receipts for the ones they had sold.

Bob looked round, his old copies of *Let's Dispute* were still propping up the bar, and the restaurant menus were still being written on the redundant dust covers of Mike Cook's book, *Pumping Silicon*.

A grin came over his face as he remembered the rather unfortunate incident with Andrea and the Mike Cook Body Building article. What a shame she'd made so much mess over the bell tower. The automated bell ringing program !Camp wasn't one of Mike's best. In Bob's opinion, things really had gone downhill after the BBC Micro-controlled self-guiding nuclear warheads – now with wings. Scud was such a silly name.

Andrea's funeral was nice.

She always wanted that reading from the carol service she liked. It was just a pity that the intelligent spell checker in Opression had got to it, and that the shepherds went to see the manager. Rev'd-up Rob Bedrup had conducted the service and the staff from the magazines had been there too.

A nice thought, Bob decided. It was so kind of Steve and Pam Turbulent to do the Victor Hugo re-enactment. Doreen gave a very moving performance as Quasimodo. The coffin was tastefully decorated with the bell ringers' standard, bearing the motto: *Go on. Give it a tug!*

Emma Brar, the Advertising Manager was there too, with her *team of little helpers*, as she called them. Mike Cook had designed a device to keep the chief executive upright, since his company Zimmer frame had been withdrawn due to the new management's cost-cutting exercises. Nut Abuser's editor, Mark Mixamatosis wasn't there, because he had a deadline to cope with.

His reminiscing was interrupted as Doreen came out of the toilet with the kids. Since Marie and Robert were put in the young offenders institute, Bob and Doreen had more time for each other. So much time in fact that five little darlings sat around the table, picking their noses.

Doreen wondered why she'd ever bothered leaving Fabian. Bob was alright, but intellectually-challenged. Only Bob and the Romchester Rogues could have spent hours hacking Camelot's computers and then chosen the wrong numbers. "Oh, it's only a bit of fun", she remembered him saying. Even Anthea Turner had noticed that Guinevere had been choosing the same numbers for the last four weeks.

Trev arrived at 9.30pm. An unfortunate incident in a pub up the road had delayed him. It seemed that he'd made a mistake when he typed *buffer* into his pocket computer. At least Casualty had managed to remove the bar stool. It was a shame the chicken hadn't survived though.

The minute he walked in the joint, Trev could see a man of distinction in the corner, obviously a big spender. "That must be Bob", he thought to himself. The Pantone Green 384 *Nobody knows I'm an 8-bit user clan* sweatshirt did give it away, somewhat.

Bob had been seriously sad at school too. He was the only member of the Stylophone Clan back then. At least he'd got rid of the *Acron users do it with WIMPs* badge. Doreen smiled sweetly. Trev tried not to notice her *Let's get Basic, you RAM* T-shirt, and gingerly stepped over to the bar, confidently ordering a bottle of Babycham.

After a few pints of Boddards, inhibitions were disappearing, and

the old memories came flooding back. The graphics enhancer Acron released, in the vain hope they'd get noticed for doing television special effects – oddly enough, the *Video percolator* was never a success.

The Electron-based stock exchange control system, and the Acron Business Crucifier – what a feat of engineering it was. Who could forget it! Of course, nobody could've forgotten Acron's first laptop, the Foolscap. Doreen remembered its WIMP interface, which was perfectly suited to Bob, in her opinion.

Trev lit a cigarette, flicked some ash on to a redundant Master Compact, and reclined (slowly) to watch the lottery draw on the bar television. As Guinevere drew her last ball, a resounding cheer was heard from the room above. Doreen hit Bob and scowled, muttering something about round tables and places he'd never heard of, although he thought they could be in Greece.

Suddenly the door flew open, and Clive appeared. "I've won. Again! I'm a multi-millionaire!" Doreen hit Bob again, just for good measure. Clive had made his money by selling bootleg copies of B&F games, the ones with the un-crackable software protection, and also hacking Pretzel.

In fact, his £17.8 million lottery win was mere pocket change, although buying Connodore shares had dented his bank balance. Slightly. He looked over his bottle of Sol and switched off the industrial suction pump.

"Bob... Bob... is that you? And.... Andrea?"

Doreen gave one of her *I'm directly related to Medusa* stares, the kind which would even put Paddington Bear to shame.

"Oh no – it's Doreen!" he quivered. "Silly me! Nobody could forget that face."

As he walked over, Bob tried to hide in his glass of Boddards.

"Hi Clive!" yelled Doreen, immediately forgetting his faux pas. "How are those Bits and Bytes and Munchies and things? Still at it? Programming, I mean." Clive ignored her. He was too busy showing Bob his dongle collection.

"Can I hold it?" asked Doreen, casually flashing her T-shirt at him. "I'm terribly user-friendly", she added, assuming her *I'm Marilyn Monroe in a new body* pose. This attracted his attention.

"I was admiring your twin 32-bit floating point processors", said Clive, not able to tear himself away from her gaze. He used his never-fail chat up line. "Would you like to see my benchmark subroutine?"

Doreen slapped Clive. "Too saucy", she shouted, before pointing at Bob and exclaiming, "This is my husband. We are happily married."

After the laughter had died down, Clive invited everyone to come up and see his new acquisition. As he walked upstairs towards the door, two men in trench coats disappeared through it, closing it behind them. At the top Clive paused nervously, which conveniently gave Trev time to catch up.

"Get on with it, man", shouted Bob. "What's this amazing new thing you've got?"

"It's called the RISC Electron", whispered Clive. "But nobody knows about it yet. Acron still haven't released details. It fell off the back of a disk drive." He opened the door, and the group walked in. Doreen looked around to see lots of anoraks and pot noodles.

One man was wearing a T-shirt with *You've had a PEEK. Anyone fancy a ...* written on it. A monitor obscured the rest of the text. Doreen couldn't make out the last word. It was another of those stupid computer jokes as far as she was concerned.

"Dongle squad. Freeze!" commanded one of the men in trenchcoats, aiming an Opple Anorak at him. Clive froze. "This drive is loaded. One false move and I click Eject."

Bob looked stunned.

"Isn't that your raincoat?" asked Doreen, gesturing at Bob. It couldn't be. Bob had been wearing his in the park earlier that afternoon, as they both well knew. The man cleared his throat and called for silence once more.

"Oh. Isn't he masterful?" said Doreen, smiling and batting her eyelids at the slightly familiar man in the coat. This was not a good move. Doreen's smiles were renowned for making men lose control. Images of that poor bus driver's face still haunted her. She often wondered how anyone couldn't miss a tree that size. Inadvertently, the man lost control of his mouse and clicked Eject with the one button he had left.

Clive couldn't move fast enough. The flying 3.5in floppy got him straight between the eyes. It was ironic he should be killed by the copy of Disk Duplicator 285 that he used to copy B&F's Chunkie Egg. Bob peered at the man, trying to put a name to the face. Eventually it came to him.

"Nigel?" he asked.

"Bob? Uncle Bob? Good grief. After all these years. How are you?"

"What happened to the hair style?"

"Well. When I found out Elvis was dead, I left my punk stage."

"Is he?" Doreen added, looking devastated.

Nigel smiled. Everyone else looked at each other with that *too much mouse-cleaning fluid* look on their faces.

"Doctor, doctor, I've got some software in my bug!" shouted Trev, pointing at a screen in a cage running Windoze. Nobody laughed.

Time passed, and after the bodies had been cleared away and the paperwork completed, everyone sat down for a drink. Bob stood up and spoke.

"The reason I invited you all here, well, Trev at least, was to let you all know that I've come to a decision." Doreen fell off her stool, muttering something about *after all these years*. Bob continued, unperturbed.

"Doreen, Kylie, Jason, Gerald, Cedric, Marmaduke and I are moving. Not just house, but country. We're all off to work for Acron New Zealand. We're leaving..."

Bob was interrupted. Recently-escaped Marie and Robert stormed in, failing to notice their mother and step-father in the corner. They had been on the run ever since Group %100 security took over the young offenders institute. Marie emptied the optics (in one mouthful), and Robert emptied the tills. They hadn't lost their touch.

Nobody moved an inch, due to the Cemtex mouse Marie had aimed at them. Robert opened his coat to reveal an ancient, unmodified Master and an AKF18, both wired up and primed. "I've been waiting a long time for this", he yelled. "We're the Acron Users' suicide clan, and we've come to save the world by destroying it!"

Bob thought the Pantone Green 384 *I'm an Acron suicide clan member* sweatshirts and badges gave that away. They weren't all stupid, after all. Did he think they were all PC users?

Robert pulled the pin out of the monitor.

The explosion was heard for miles.

To PC or Risc PC —

I HAVE noticed over the past year that IT teachers at my secondary school seem to be changing their trusty Acorn Archimedes (A5000 machines) to 486 PCs. I asked the school's IT teacher why and he didn't really have an answer apart from that PCs are used in the workplace and Archimedes are not.

Are Acorn losing their grip on education to other platforms? I am currently thinking about buying a Risc PC, but if Acorn are going *out of fashion* I was wondering it it would be worth it.

If I was to buy a Risc PC would I be able to use PC hardware as well as Acorn? Will Acorn ever get their great machines into big business? I also want to know if software developers are going to start making some of their games on CDs?

T. D. Hilborn, Buntingford, Herts

Acorn still have the monopoly in the primary sector – I think that at the last count it was 95 per cent. The secondary sector has been less successful for Acorn due to the spurious argument about wanting to use the machines used in the real world. *However, this real world moves an awful lot faster than education can physically and financially follow.*

A 486 PC is now a base model, and for a lot of PC applications is already out of date. The argument basically boils down to one of training versus education. Many governors of schools come from a business background, and when they see their word processors and spreadsheets not running on Acorn machines, this is perceived as a bad point. For the less far-sighted that means that a PC must go into the school. However, these will not last as long as the Acorn machines.

They are more expensive to maintain, the software is more expensive and there is less choice of quality British educational products.

To address the marketing problems – which at its base level this is – Acorn have developed the Risc PC with its inherent capability of being a 486 or Pentium or whatever next, as well as being a very powerful Acorn machine. Thus pleasing the businessman and the teacher.

The PC Card – which we now have a copy of – will allow you to access PC software (on disk or CD) as well as hardware such as SoundBlaster cards, scanners and so on.

Acorn will never gets its machines

A fable for Acorn Computing

IN book xii of The Odyssey, Ulysses has to pilot his ship between two monsters – Scylla, the man-plucking creature of the rock, and Charybdis, the whirlpool. In avoiding one he must approach the other. Homer's tale has become the metaphor of a dilemma as old as time, and as inescapable. Acorn, as the recent incarnation of the eponymous hero, must now chart passage between two monsters – the whirlpool of Windows and the rock of Isolation.

In the rival mythology, Microsoft said, "Thou shalt have no other operating system but DOS. And DOS shall not die, but shall be reborn, as Windows." But the proud, who erected false operating systems, were cast into outer darkness, along with Digital Research, Gem, Commodore and Sinclair.

Odysseus was the most cunning of the Greeks and foresaw danger even though he could not avoid it. Acorn have been as nimble-witted as he. The first release of RISC OS in 1985 was accompanied by the Acorn PC Emulator in Software. Never quite up to the demands of running DOS applications adequately, it was hopelessly under-specified for Windows. Better things followed, in the shape of a succession of hardware PC expansion cards from Aleph One. The latest, with clock doubled 486SX 25 and co-processor, offers respectable raw power, but is crippled by its reliance on an outdated eight-bit bus for communicating with the ARM.

To survive in a Windows dominated world, Acorn have taken the only step left open to them – the dual processor Risc PC. All things to all men. An Arc to the initiated, a PC to the masses. In a myth that was old when Troy stood, Uranus (Heaven) fathered a son, Chronus, who overthrew him. Acorn risk a similar fate to Uranus.

As Acorn machines become ever more effective platforms for Windows, RISC OS software developers will be overwhelmed with competition from the much more heavily invested Windows products with their glitzy front ends, snazzy installation routines and massive features overkill. As the Acorn software houses go to the wall, the already stretched software support for RISC OS will shrivel and Acorn will be left high and dry, like a bypass-blighted petrol station.

This is the cruel choice – ignore Windows and suffer isolation, or embrace Windows and be overwhelmed.

Circe advised Odysseus to choose Scylla, arguing that, "It is far better that you should have to mourn the loss of six of your company than that of your whole crew." Acorn have steered the dual processor route. They seek salvation in the inate quality of RISC OS and the performance of the ARM. The combination provides such a superior platform that native applications will continue to maintain an edge. The portents are ominous. Colton Software report that their dual platform Fireworkz runs faster on a top spec PC than an Acorn platform. There may be compiler differences to account for this.

Meanwhile, a few glimmers of hope – Windows is a lousy GUI. It is crippled by its DOS underlay. It spends its time doing endless disk accesses and asking for confirmation. *Do you really, really want to delete this full stop?* It hasn't got an iconbar or enough buttons on its mouse. Its successor, Windows '95, is way behind schedule and looks like becoming Windows '96.

The Pentium is too hot, too complex and too CISCy. Intel are cosying up to Hewlett Packard to get their hands on some RISC technology and there are more people than Acorn who would like to slow down Microsoft.

IBM's OS/2 is quite the nicest OS that never was. In the meantime, Acorn have a good toe in the education market where they have astutely appointed Alan Bennett to pilot the primary division.

They have some good commercial chances in the tie-up with Kodak, and they own a bit of ARM who can still deliver more MIPS per penny than anyone else.

The second processor is late and the higher spec board from Aleph One is having to have its ASIC redesigned. Well, you'd take your time digging your own grave wouldn't you?

Clem Vogler, Foulsham, Norfolk

But people can learn from history and fables – which is the reason for studying them – and there is always the saying: It is always darkest before the dawn.

that is the question

into big business as they don't have the marketing clout of IBM or Microsoft.

When it comes to games, Simon the Sorcerer will be the first game on CD on the Acorn machines, and at time of going to press this is scheduled for release at the Harrogate show.

Adventuring into the unknown

I AM a programmer in Basic, and at the moment I am compiling an adventure game. I have only just started and I have run into a problem which I cannot work out.

I am using system sprites and have already created a backdrop and my character with a transparent background. Everything okay so far. But when I plot my character on to my backdrop in Basic, the place where I surrounded my character in transparent becomes *white* – which is the colour the sprite file started off as. You can see the character, it is just the area surrounding him.

I plot him using the **SCHOOSE* and *PLOT&ED,0,100* commands.

I have been getting very frustrated with this problem and any help would be appreciated.

Could you also tell me how to save your place in an adventure game to make a save game option?

Kevin Nicholls, Hook, Hants

Using the system sprite area is very bad form – after all, what if the person who wants to play the game doesn't have any system sprite area configured? And the OS commands you're using don't allow the use of the sprite mask. You should at the very least be using the OS_SpriteOp commands. Details are beyond the scope of a reply here, I recommend you read Terry Blunt's book, listed below.

Play it again Sam

RECENTLY I acquired an A4000 for home use. On investigating the games market I found the quality and choice of games to be of a high standard. I have since bought two games: Flashback – which I would recommend to anyone – and Stunt Racer 2000.

However, one area in which I personally feel the Acorn games market suffers is in the sports games department.

Okay, I accept that we have the likes of the excellent Sensible Soccer and possibly Virtual Golf, but after these two titles it is difficult to see any other quality sports games. What I would like to know is what sports games are in the pipeline at the moment? In particular, are there any American sports games? There has been an abundance of these games on the Sega, Nintendo and Amiga, and it seems as though the Acorn games market has missed out.

S. Williams, Ampthill, Bedfordshire

Nothing is planned I'm afraid, and the reason for this is that the Acorn's main markets are the UK, South Africa, New Zealand/Australia and Germany/ Holland. The other machines you mentioned have a large following in the US as games machines, therefore it is worth the development and marketing time.

Game on

I HAVE just purchased an Acorn A3000 series and I am interested in programming games. I have not yet seen a magazine with anything on programming games and there are no disks on it. I was wondering if you could help.

Gerard Feeley, Moston, Manchester

An excellent source book and reference would be Terry Blunt's book, The Archimedes Game Makers Manual (Sigma/Wiley). Available from a good bookshop or from the publishers on 0243 770318.

Helpful images

PERHAPS you could help by publishing an appeal for a second hand Watford monochrome video image digitiser board produced for the Archimedes. My company uses this now discontinued product in an inexpensive body scanner. The scanner is used throughout the country for the detection and treatment of a spine deforming disease called scoliosis which predominantly attacks young children.

One problem is that a number of the digitiser boards have been lost during servicing, and we have run out of replacements. If any of your readers have fully working Watford monochrome image digitiser boards I would be happy to buy them for more than the original purchase price.

Dave Groves, Quantec Image Processing, Liverpool

If you think that you can help Dr Groves then you can contact him directly on 0925 571 392 or 0836 644 145.

Printed favourite

I RECENTLY bought the latest inkjet from Epson – the Epson Stylus Colour. With a three year guarantee it is the only colour inkjet printer that prints at a resolution of 720x720dpi and when using the correct paper, it is as good if not better than most laser printers with a print resolution of 600dpi or higher.

The printer came with the necessary documentation and software for running it on a PC and Windows. My local Acorn dealer supplied me with Acorn's printer drivers, which at the moment only support 360dpi. However, I bought Computer Concepts' Turbodriver which supports all dpi modes with normal and special coated paper. All worked well – up to a point – but the bugs were fixed with a beta copy of the latest Turbodriver software. I can wholeheartedly recommend both the driver and the printer.

P. A. Cherry, Warminster, Wiltshire

The end is here

The demise of Acorn Computing leaves an embarrassing hole in the Acorn retail magazines market. There's now no magazine that handles complex subjects in a comprehensible way – without being condescending.

The Editor of Acorn User, Mark Moxon, has promised to try to fill the gap, and I certainly hope he succeeds.

Pam and I would like to thank all of you who have sent kind letters about the closing of the magazine and concern for our personal futures. I can assure you that I will be busily engaged programming Acorn machines and installing networks of them in places they've never appeared before, and Pam is working on a new education magazine to be launched later this year.

To all our contributors over the years, thank you, and to every reader, I wish you well. And remember, Acorn *do* produce the best personal computer around.

Steve Turnbull, Editor, Acorn Computing

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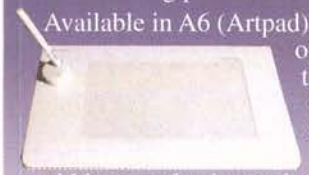

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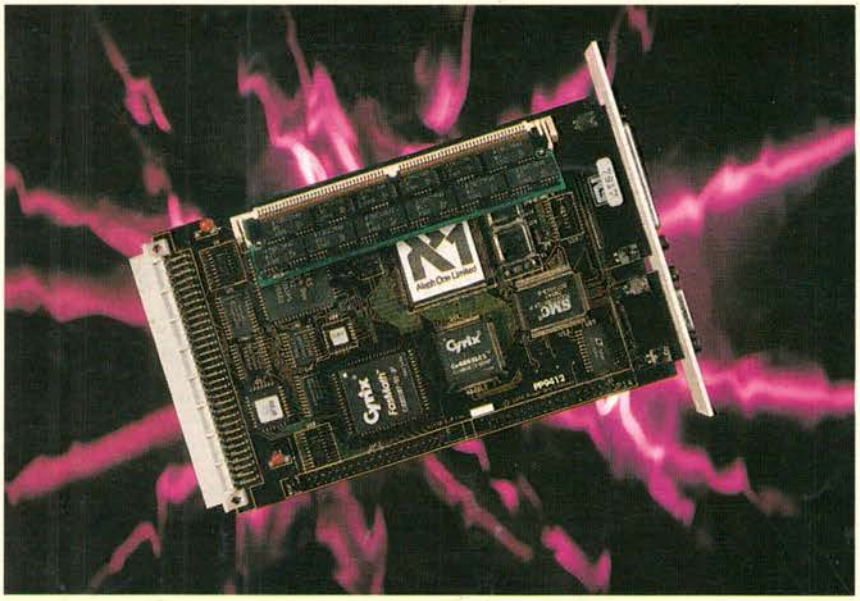

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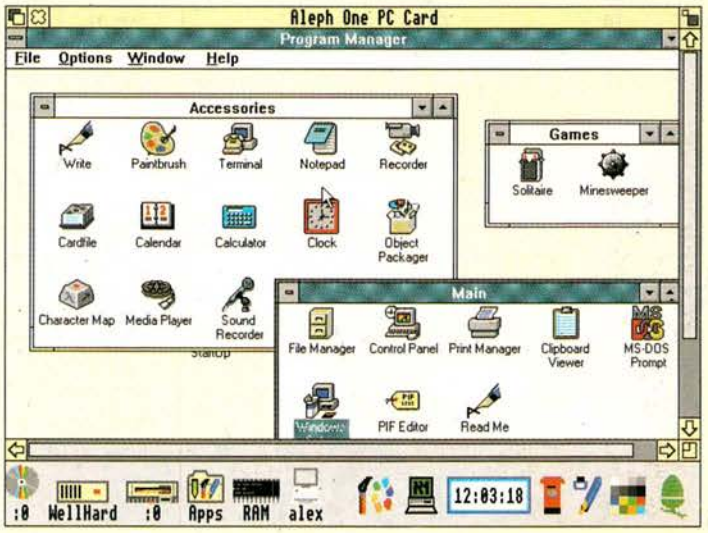

When you need to run the latest industry standard Windows software on you Acorn A-series RISC computer, there's only one choice. Aleph One's range of powerful PC cards place a real PC in the heart of your computer. Switch between DOS and Microsoft Windows and RISC OS applications on your desktop, or use your computer as a powerful dedicated PC with its ARM processor acting as a graphics accelerator.

Share your Acorn peripherals

Save money compared with the cost of buying separate systems: the PC card can use all your Acorn peripherals including hard discs, removable discs and CD-ROMs, Ethernet network cards and printers.

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Recommended retail prices

486PC/25MHz 0MB RAM	£339.00 ex VAT
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